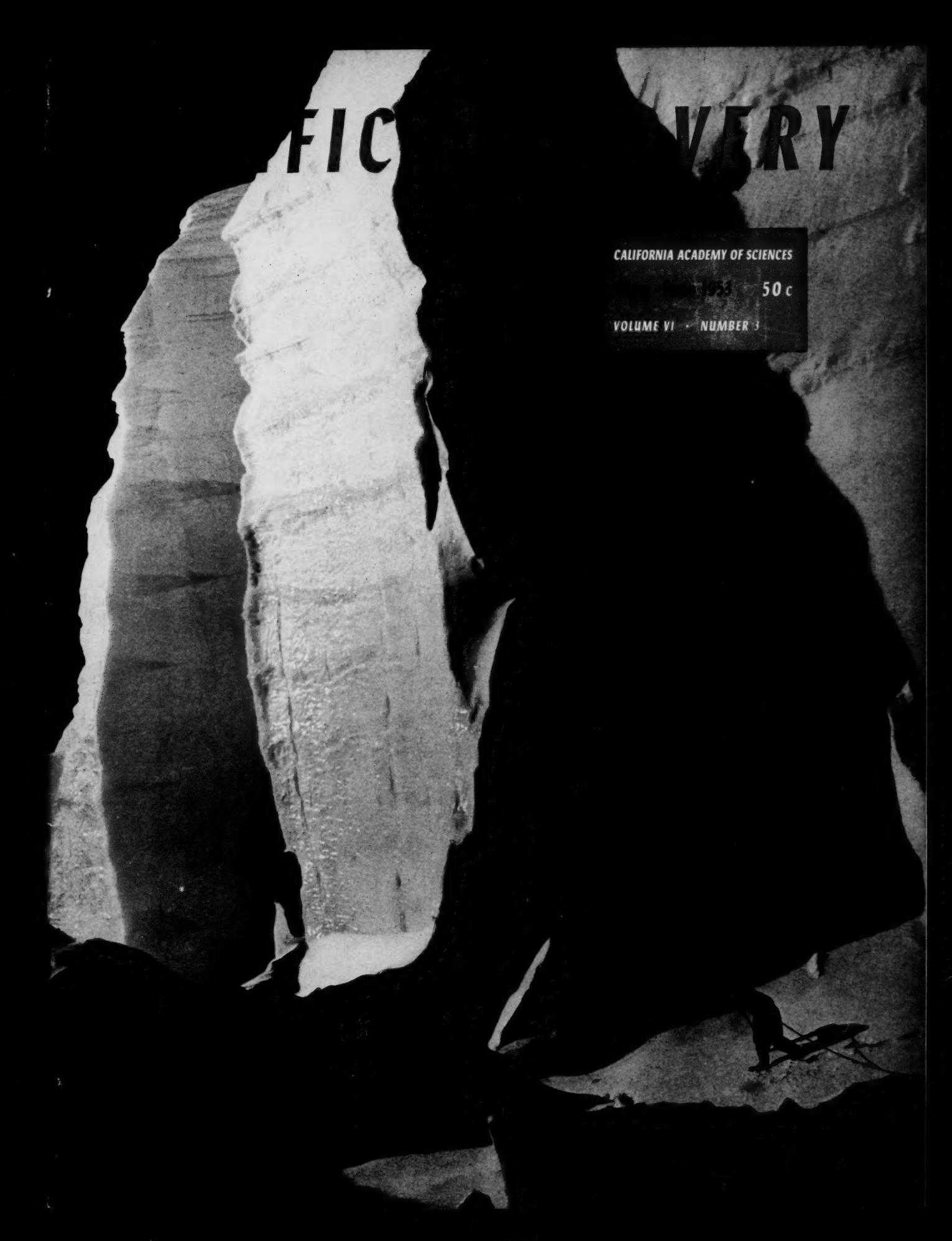
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A JOURNAL OF NATURE AND MAN **PACIFIC DISCOVERY** IN THE PACIFIC WORLD

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PRE-DISCOVERY

THERE ARE MANY ALASKAS. The Alaska of Matanuska and Tanana valley farmlands, of giant spruce and cedar and totem poles, of gold and the teeming wealth of fisheries, of growing cities and increasing population, has been described and pictured in glowing terms in many books and periodicals. Alaska as the Land of Opportunity for overcrowded Statesiders, and other Outsiders, as the Mecca for postwar tourists via the Alaska Highway, or as the place to invest your capital and get rich on pulpwood or other natural resources — that Alaska has its heralds and its prophets. We proclaim from other rooftops. Ours is the Alaska of incomparable mountains — young mountains triumphant over mighty glaciers — of a magnificent but threatened wildlife, of the widest unexplored wilderness remaining to North America, of the trackless tundra rolling north to the Arctic Sea. Even more, it is the Alaska that Science has but recently discovered. As with each of our special issues, all we can do is sample the subject, trying to indicate its scope and where the reader can go from here. If Alaska is indeed a new frontier of scientific investigation, more and more books, articles, films, and other media will enrich the record of discovery. "Science Discovers Alaska" is a keynote well sounded by Governor Heintzleman.

Science in Alaska 1951 is the title of a 362-page, paper- and plastic-bound book that came to our desk as we go to press, too late for the Reviews. A substantial part of "the record," it is the Proceedings of the Second Alaskan Science Conference, just issued. The meeting of over 200 persons in McKinley Park, September 1951, marked the inauguration of the Alaska Division of the American Association for the Advancement of Science. The real significance of the event, however, was that for the first time a large and representative gathering of those who are making Alaskan science history was taking place *in Alaska* — Alaskan science had come of age. The Alaska Division, A.A.A.S., took over thenceforth and made its own the annual Alaskan science conferences, the first of which was so successfully sponsored, in Washington, D.C., 1950, by the National Research Council. We suggest that anyone interested in the progress of science in Alaska write Alaska Division, A.A.A.S., Box 938, College, Alaska, for this volume of Proceedings. The Fourth Conference will be held in Juneau this year, September 28 to October 2.

DISCOVERING PD'S AUTHORS

Pacific Discovery thanks **B. Frank Heintzleman,** busy Governor of a rapidly growing Territory, for contributing the lead editorial, "Science Discovers Alaska," with his signal statement that Alaska is promoting its own scientific progress. The new Governor's grasp of the aims of science is well known. . . . ¶Although his wildlife work as naturalist with the National Park Service is now largely in the Yellowstone-Grand Teton area, **Adolph Murie's** long association with the Service in Alaska is not ended. He will be in the Territory again this summer. . . . ¶Our associate editor, **Dr. Ira L. Wiggins,** needs no introduction here. Since 1950 he has been on leave from Stanford University's Botany Department, serving under contract of The Johns Hopkins University with the Office of Naval Research as Director of the Arctic Research Laboratory at Point Barrow. . . . ¶"Glacier Flight," by **Dr. G. Dallas Hanna,** Academy curator of paleontology, was adapted from the magazine of the Women's City Club of San Francisco, in which it appeared a dozen years ago under another title. Dr. Hanna's extensive and varied Alaska field work has ranged from the Pribilofs to the Panhandle. . . . ¶One of the many scientists who have made the Arctic Research Laboratory headquarters for arctic studies is **Dr. Robert F. Spencer,** associate professor of anthropology at the University of Minnesota. Working among the Eskimos has only enhanced his respect for this hardy people. . . . ¶Our photographic contributor, **Dr. Bradford Washburn,** is mentioned elsewhere on this page and in the Reviews. D.G.K.

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THE COVER COPY

ALASKA is not all ice — but ice, in all its terrible beauty, is an ever-present challenge to those who climb Alaska's mountains. One who climbs for scientific discovery, Bradford Washburn, photographed this great ice block in the séracs of the Brooks Glacier, 15 miles east of Mount McKinley.

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EDITORIAL

Science Discovers Alaska

LONG described as our nation's "Last Frontier," Alaska's 586,400 square miles today constitute a great scientific laboratory, making it the North American continent's "First Frontier" of arctic and subarctic research. During the past seven years scores of scientists from the United States, Canada, Norway, England, France, and other countries of the Free World have probed the mysteries of the high latitudes under sponsorship of the armed services, civilian government agencies, universities, research organizations, and private industry. Further recognition of Alaska's growing importance is evidenced by the fact that more and more scientists are choosing the Territory as their permanent home, a place in which to study and live throughout the year.

Although outstanding scientific accomplishments have been recorded by historical trail-blazers like Alfred H. Brooks, William H. Dall, John Murdoch, Henry Elliott, Robert Kennicott, and others, it can safely be said that it was in the period following the close of World War II that "Science discovered Alaska." Never before has so much effort been expended in the pursuits of basic and applied research. It is estimated that about 300 scientists have worked in the Territory each year during this period. If civil engineers and others in the industrial sciences were included in that estimate, the number would swell to more than 1,000. Putting it a different way, one adult out of every 83 in Alaska is engaged in some field of scientific endeavor.

During the past seven years there have been established in the Territory on a year-around operating basis the Arctic Health Research Center at Anchorage, the Radio Warning Service of the National Bureau of Standards near Anchorage, the Arctic Research Laboratory near Point Barrow, the Geophysical Institute at the University of Alaska, and the Arctic Aeromedical Laboratory at Ladd Air Force Base near Fairbanks, to name just a few of the new Alaskan research laboratories that are making noteworthy contributions in numerous fields of science. At the Arctic Research Laboratory, to cite just one example, more than a half century (in terms of man-years) of research in the biological and earth sciences already has been performed!

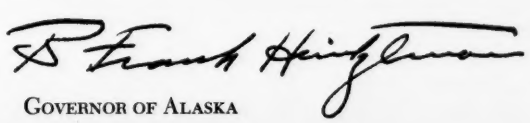
The scientific progress that has been achieved in the Territory first received nation-wide attention during the First Alaskan Science Conference held in Washington, D.C., in 1950, under sponsorship of the National Academy of Sciences, National Research Council, and the Arctic Institute of North America. As the direct result of this meeting there was organized an Alaska Division of the American Association for the Advancement of Science, with branches located in Juneau, Fairbanks and Anchorage. General science conferences were held at Mt. McKinley National Park in 1951 and 1952. Each was attended by more than 200 persons, demonstrating further the growing national interest in Alaskan science. The Fourth Alaskan Science Conference, to be held in Juneau, the Territorial Capital, late in September of this year, marks another significant milestone in the progress of science in Alaska.

Much of the scientific research now being conducted is directed toward making the Territory a better, more healthful, and more prosperous place in which to live – a future home for the thousands of Americans who are destined to settle eventually in the Far Northwest. A big job, however, remains to be done. Alaska today is on the threshold of an era of rapid industrial growth, perhaps the most rapid in its history. The Territory's rich and varied resources, its forest, fishery, mineral, agricultural, waterpower, and recreational wealth are receiving more and more attention from industry and the public at large as the national population grows, as the demand for raw materials increases, as a greater drain is placed upon domestic resources. But before Alaska's natural wealth can be economically and wisely used for the benefit of all our country's citizens, additional scientific investigation will be required. Another important factor to be considered is that increased utilization of resources, and subsequent population gains, will present new problems in conservation for which realistic solutions must be found.

While rapid expansion of activities in the engineering and industrial sciences is certain to occur, it is equally important that research be accelerated in the fields of agriculture, botany, forestry, medicine, physiology, public health, geology, geography, sociology, economics, education, anthropology, geophysics, meteorology, oceanography, fisheries, wildlife, zoölogy, and many others. All play a vital role in the bright and promising future that belongs to Alaska.

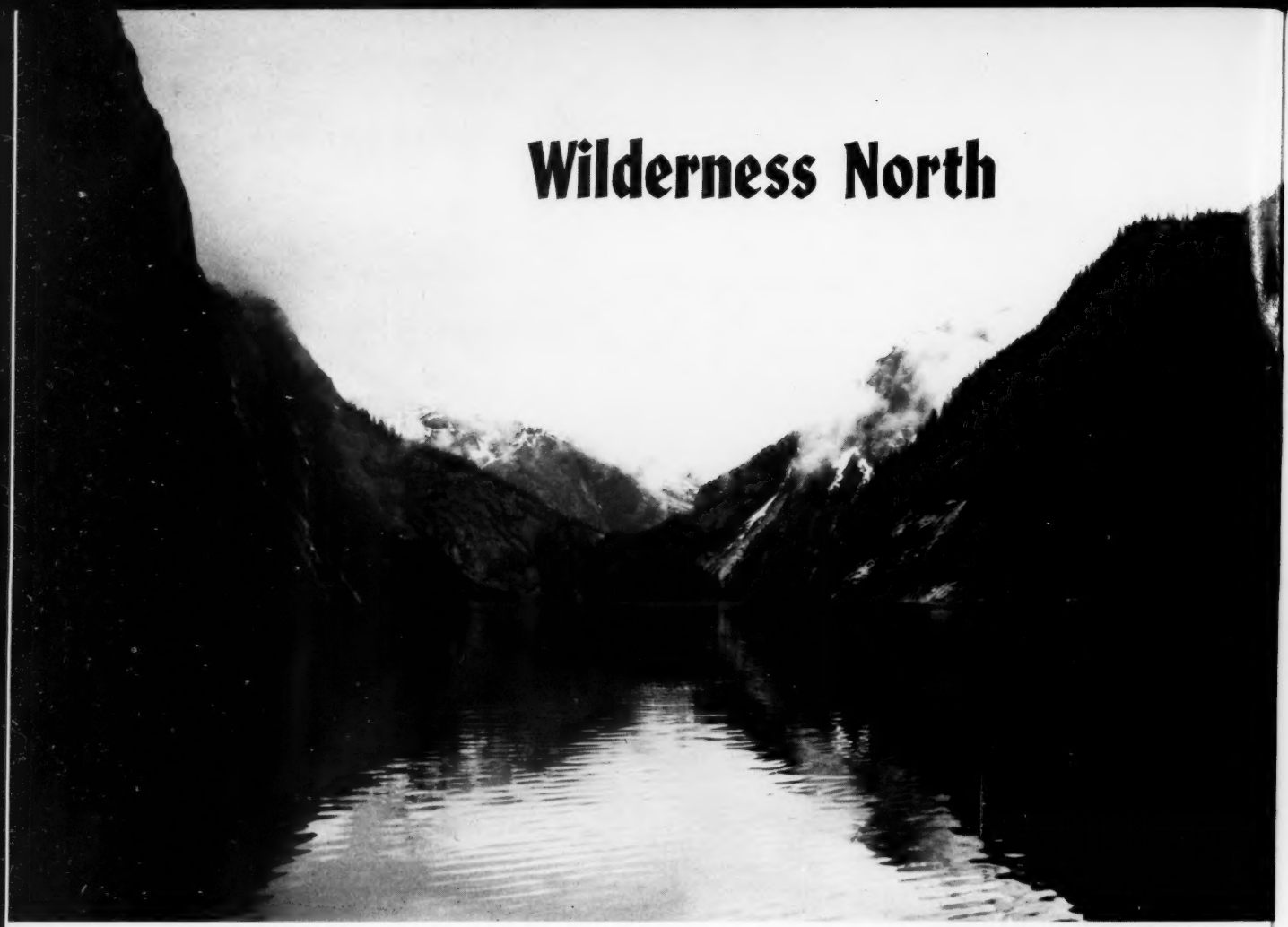
The task confronting scientists in the Territory is great, but it is one, I am confident, that can and will be surmounted. Alaskan scientists already have demonstrated that they are equal to the challenge. The scores of new, young scientists who will find opportunity and success in the Territory are certain to write a new, dramatice chapter in the history of the advancement of science in Alaska.

JUNEAU, ALASKA, MAY 1953



GOVERNOR OF ALASKA

Wilderness North



Ford's Terror.

ALASKA'S NATIONAL PARKS AND MONUMENTS . . AND OUR LAST UNEXPLORED WILDERNESS

Adolph Murie

I HAD COME NORTH to follow the caribou. In those days, the train from Anchorage to McKinley Park carried conventional sleeping cars, but somehow I did not manage much sleep. The anticipations were too happy – or was it the lurching of the car over the new railroad, still under construction up the line? (Until recent reconstruction, a freight car occasionally jumped the tracks, rode the ties for a stretch, and hopped back on again at the next sharp curve.) We arrived at three o'clock in the morning, and to my disappointment there was no one around except a fellow with a lantern to get the mail sack.

This was 1922, when McKinley Park was only five years old. Two years earlier, before there had been any protection, the market hunters were bringing out mountain sheep meat to supply the railroad construction camps. Harry Karstens, forthright, honest, and rugged leader of the first ascent to the highest peak on Mount McKinley, and recognized as an outstanding wilderness traveler – be it hiking, riverboat, pack horse, or dog-team – was appropriately the first superintendent of this Alaskan wilderness.

What was the administrator to protect and cherish in this new national park? We can name only a few sample items: There is the mossy tundra, so soft and springy to the step; and in the

Photographs by the author

tundra are the accumulated caribou trails, parallel, a few feet apart, where herds from years past traveled in a broad front, and still do; there are the flowers, the tiny, purple Pinguicula, almost hidden in its moist cushion of moss; the many kinds of saxifrages; and the fireweed, showing where the tundra has been disturbed; the white sheep, in their rugged homes, willing to take the same risks as their ancestors and cross the valleys to sweet, tender forage on summer ranges near the glaciers; the grizzlies, roaming freely; hundreds of fox dens; and even a few wolves, such wide wanderers that they move beyond the boundaries of the Park which they cannot scent or recognize. There is the patch of black spruce almost a hundred years old, yet only a foot or two tall.

And to the westward a hundred miles is Mount McKinley, higher than all the peaks in the Alaska Range. It can be seen from afar — from Fairbanks and beyond to the north, and from the coast. Archdeacon Stuck, who climbed the mountain, liked best the view from Lake Minchumina, a number of miles out in the tundra. In the Park we approach Mount McKinley near Wonder Lake, some 20 miles from the pass the climbers use to attain Muldrow Glacier which they follow upward. Here we must plan with care, sensitively, to preserve the primitive atmosphere.

McKinley Park is the only area in Alaska that has been given national park status. However, two national monuments on the coast, Katmai and Glacier Bay, are comparable to the finest national parks. Two other monuments embrace but a few acres. One of these, Sitka, consists of a number of refurbished totem poles set up in the woods adjoining the town of Sitka. The other is Old Kasaan, the ruins of a Haida Indian village.

Katmai National Monument, the largest Park Service area, is located at the base of the Alaska Peninsula. In 1912 Katmai volcano, in a catastrophic explosion, expelled ashes so violently and in such quantity that Kodiak Island, a hundred miles away, was enveloped in total darkness while the ashes rained. The valley below the volcano became the Valley of Ten Thousand Smokes, and the pumice rock thrown out still floats along the lake shores.* Vegetation was smothered by the ash over wide areas, but quickly began its recovery and is gradually working into the valley itself. The phenomena were studied by scientists and the story is detailed in *The Valley of Ten Thousand Smokes* by Robert F. Griggs.† In 1918 the area was given monument status and in later years it was twice enlarged to include more fully the Katmai wilderness. Besides its volcanic phenomena, the Monument has an extensive wilderness, with lakes, ponds, mountains, and coastline with snug-looking inlets, and charming Geographic Harbor. It contains a wealth of animal and plant life. In a flight around the boundary in 1951, we saw ten brown bears.

In southeastern Alaska is Glacier Bay National Monument, which comprises Glacier Bay with all its inlets, glaciers, and the surrounding mountains rising from the water's edge. It was set aside in 1925. Here the geological processes are so rapid that they can be measured by an ordinary clock. As late as 1700 the bay, out to near its mouth, was a huge glacier, and in the last 50 years the large Muir Glacier has retreated thirteen miles or more. A period of warmer climate has melted back the glaciers, revealing the tree stumps of a previous warm period. Up the outside coast is Lituya Bay, famous for its unique beauty and the rush of tide through its narrow entrance.

In June of 1951 a group of us toured the Monument in a boat (there is scarcely any other way). As we passed up Muir Inlet I recalled John Muir's intense interest in the glaciers here, and the interest of other scientists in the geology and botany. And it seemed strange that before 1900 large parties of tourists visited here on excursion steamers and spent time hiking in the vicinity of the glacier. We followed up the inlet, working our way past many icebergs that had broken off the

". . . It would seem wise to strive to maintain the beauty in the world, and a little elbow room"

*Katmai volcano erupted again in February, 1953, after this manuscript was written. Again ashes have rained down on Kodiak Island.

†The National Geographic Society, Washington, D.C., 1922, 341 pp., illustrated.

We looked for the glacier in an arm of Ford's Terror.

Glacier Bay — retreating ice revealed stumps of pre-glacial trees.

A few glaciers, such as Columbia in Prince William Sound, still reach salt water.

front of the glacier, but we were finally stopped where they choked the bay. During the day we saw 20 goats on Mt. Wright and adjacent slopes; gulls, terns, cormorants; and the pigeon guillemots who drop their blood-red legs as though to alight gracefully on the water, only to plop and splash.

That night we anchored at Sandy Cove and during the following three days journeyed around the bay, exploring the many inlets with their glaciers. Toward the coast, Mt. Crillon and other peaks of the Fairweather Range were constantly in view. The fronts of the Grand Pacific and Ferris glaciers, spilling their bergs into Tarr Inlet, have retreated beyond the border into Canada. These glaciers and nearby Marguerite were extremely active, the huge bergs sliding or falling forward into the bay with thunderous noises and sharp reports.

There are many other outstanding areas in the interior of Alaska and on the long coastline, especially in the Tongass and Chugach national forests. Two years ago some of us, on behalf of the National Park Service and with Forest Service coöperation, toured southeastern Alaska, Prince William Sound, and the Kenai. We followed the narrow channels between islands, ascended numerous inlets, the last one rivaling all the rest in idyllic beauty, watched tremendous icebergs break away from the fronts of the array of glaciers in College Fiord and elsewhere, observed large flocks of water birds, and came away feeling that we had passed through a wonderland of beauty and interest.

Ford's Terror was one of the most impressive experiences. To avoid the strong tidal currents we passed the narrow entrance at high tide, and found ourselves in an awe-inspiring fiord, hemmed in by sheer rock walls on either side. Silvery waterfalls, both high and miniature, cascades, water sliding over steep, smooth rocks, all in endless variety, adorned the high, dark walls. We moved slowly in the milky, green water, making sharp turns into new passages, new waterfalls. In the midst of it all the cook called lunch and we stopped where the passage had a slight widening and dined with a feeling of festivity in this enchanting scene.

At the head of the fiord were two short forks and we skiffed to the muddy shore of the one to the right, and followed a stream around a bend to look for the glacier that had receded up the rocky valley, as though a thing alive. On the way to the boat hair seals came close to look at us. Over at

the head of the other fork was a grassy flat on which a black bear was feeding on one side and a brown bear near the other margin.

Near the outlet a shaggy goat on the face of the rock wall became alarmed and, on the brink of catastrophe, made short jumps across wet, slippery rocks, so steep they had to be taken at a run. He climbed behind a crag and reappeared above on a ledge partly under an overhang. He made a run up a slippery rock, but it was too steep and he slid backward on his haunches; and when he tried another rock he slipped and fell on his side. He had reached a cul de sac in upward progress. Realizing he could go no higher, he stood on the ledge, a waterfall breaking on the rock beside him, watching us pass from view around a bend.

The following morning we entered Tracy Arm and found another spectacular waterway, in part resembling Ford's Terror, but containing more steep slopes falling away in grassy ledges, on which we counted 60 goats. In the upper part of the cove we encountered increasing numbers of icebergs, deep blue in the shadows, and at the head of the cove over a hundred hair seals lay on the bergs between two active glaciers. Near the mouth of the inlet an otter loped along the beach and in to the woods, and a black bear saw it, sniffed the tracks, and looked up where it had gone.

Speaking of these two fiords, a fisherman living alone nearby said that the scenery was so overpowering, so spiritual, that he sometimes had to get away from it – we could understand.

In the fall of the year on the tidal flats of the Stikine River, many ducks and geese congregate. Large numbers (4,000 estimated one year) of snow geese spend several weeks feeding on the bars. We were there in early May. Leaving the dock at Wrangell in the dark in two 19-foot Peterboro canoes, we were soon skipping lightly over choppy waves in the starlight, crossing the tidal flats while the tide was high. We slept in a cabin on Sergief Island near the main channel so that we could get a good start up the river the following day.

Next morning, out on the tidal flats thousands of glaucous-winged gulls were resting in deep rows on the bars, while others filled the air with their flight and their cries. Many Bonaparte gulls were also assembled; and, perched over the flats, were 60 or more bald eagles, and many others were in the area. These gulls and the eagles had been at-

Glacier Bay – a view from Lone Island.

Yale Glacier, in College Fiord, sends its bergs to sea.

We beached our Peterboro canoes at the mouth of the Stikine River.

Caribou range the mountain tundra above timber line in summer . . .

. . . and move down the slopes to the spruce taiga in winter.

tracted from afar by the candlefish, a kind of smelt, which had come here to spawn. Many of these fish were stranded on the tide flats, and in the river some were seen swimming near the surface, a few weak and on their sides. Formerly the local Indians are said to have rendered the oil from this oily fish and used the excess for bartering with other tribes. This great assemblage of fish and bird life is a prodigious, primitive event which is indeed a major feature of the region.

In the interior there are many mountainous regions. McKinley Park is but a section of the long Alaska Range. A few years ago two of us walked up the Healy River, crossed a pass and descended into the Wood River country, to the east of the Park. We explored up the river toward the glaciers, and down river. In the woods we came upon beaver ponds with grayling in pristine numbers; we followed a game trail where the bears had stepped in the same footprints for years, so that even in solid soil the tracks were deeply worn. Going up the river bars we saw wolf tracks, and examining the strategic trees at the edge of the bar, we noted that they were scratched and bitten and that bear hairs were stuck to the pitch – rubbing trees used by bears traveling up and down the river. What big country to explore! How many passes we wanted to cross! And mountain sheep were widely dispersed. Here was more wilderness, all of which must be cherished.

The areas in Alaska given national park and monument status and protection have been briefly characterized, as have a few samples of other outstanding areas that should be protected in one way or another. One may ask, why did anyone think of establishing Mount McKinley National Park and the monuments twenty-five or thirty years ago when Alaska, even today, is mostly wilderness and is being preserved, albeit in a negative way? For reply we can recall how fortunate it was that Yellowstone Park was established far beyond the frontier; and how *unfortunate* that we waited so long elsewhere before attempting to provide for the public interest.

There is a project now being considered, which should be regarded in the light of this need for early planning. The proposal is to establish an arctic wilderness international preserve in northeastern Alaska which would include the eastern part of the Brooks Range and the rolling tundra stretching to and beyond the Canadian border. It would be a place for caribou and other north-

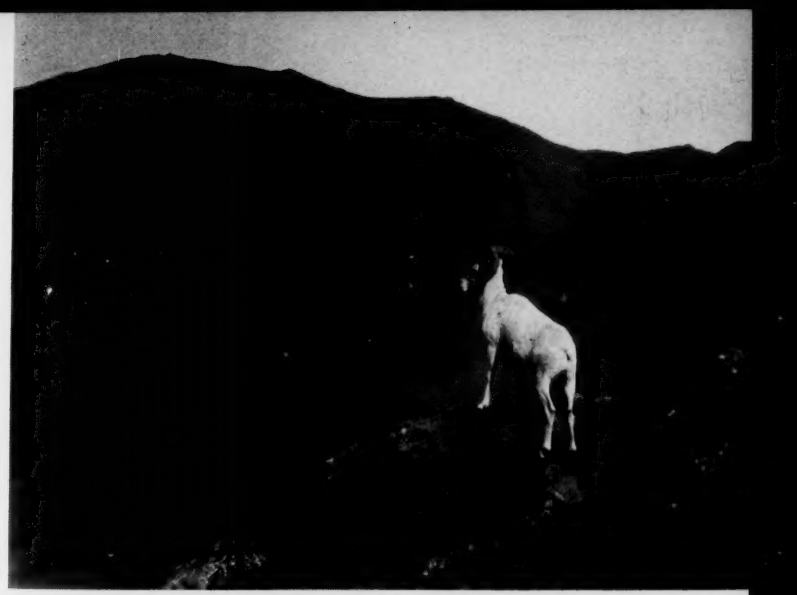
Two yearling lambs investigate the photographer. The white Alaska mountain (Dall) sheep are protected in Mount McKinley National Park . . .

ern animals. I have not seen the area, although in 1922 my brother and I penetrated the Brooks Range farther to the west with dogteams, and viewed this rugged sheep country from the ridge tops and looked into the tundra country stretching off to the coast. The area seems far off, but considering the transportation today it is less remote than was Yellowstone when it was established in 1872. Such proposals are encouraging and hopeful.

Many Alaskans are wondering about the future. One evening, on a remote island, there was discussion of various conservation problems, including water pollution, zealous pulp sentiment, lake shore leases, hunting, fishing, effect of logging on salmon streams, wilderness preservation – touchy subjects, some of them. Both optimism and pessimism were present. A young, talented, thoughtful Alaskan expressed some doubt about the future – "After making 48 mistakes Outside, is it not easy to make the 49th up here?"

On another occasion a prominent Alaskan remarked that planners were working overtime to change the frontier to typical city life. The thought was expressed that there was too much concern with economics and business and that more consideration should be given to preserving the beauty of Alaska. This observation suggests a quaint remark of the father in *Storevik*, the story of a family in a Norwegian fiord. One of the boys had grown up into "a brisk, firmly-spoken young man who went to agricultural college. As soon as he graduated, he planned to transform Storevik's old moss-grown, romantic terrain into a flat, up-to-date pancake." Did the curriculum lack courses in "Esthetics of Wild Country," or "Appreciation of Mouldering Down Logs"? Was the boy's education only a half circle?

The national parks and monuments are but one phase of land planning in Alaska. Several government agencies are influencing the future of the territory, and all of them are dedicated to serve the public interest. But it is difficult to know what is in the public interest, because values are variously rated, and there may be over-emphasis of special fields. For general guidance, it would seem wise to strive to maintain the beauty in the world, and a little elbow room. In such planning the national parks and monuments hold an important place. And in the meantime the Alaska Wilderness can enrich us all through imagination and memory. **END**



. . . and are "among the handsomest animals of the Mount McKinley region."

The red fox is commonly seen in the Park.

A sight of the Toklat grizzly bear in its native habitat "is one of the rarest treats" of the Park. (All animal photos taken in McKinley Park)

IRA L. WIGGINS

North of Anaktuvuk

SEVERAL THOUSAND square miles of tundra, a land frozen solidly from the surface downward nearly a thousand feet from September to June, stretches northward from Anaktuvuk Pass to the Arctic Ocean. Anaktuvuk Pass is a narrow valley running northward through the Brooks Range from central Alaska to the Arctic Slope, and for untold centuries has been a major game trail through which the vast herds of caribou migrated twice a year — northward with the advancing spring, southward ahead of winter's blizzards. Before the white man traded muskets and rifles to the Eskimos in exchange for pelts and whale bone, the Nunamiut Eskimos living in and near Anaktuvuk called themselves "The People" and yearly took toll of the migrating herds. They drove the bewildered caribou into stone and brush enclosures and dispatched them with lance and arrow, or, when the caribou escaped the corrals, the hunters attacked the flanks of the herds as they surged through the narrow valley on their southward trek. To these people the migrating caribou meant life itself, for without large supplies of meat for food and skins with which to roof their willow-ribbed huts, the long, cold winters would have brought death by starvation and freezing.

To the Nunamiuts, Anaktuvuk Pass was — and still is — home, the dwelling place of their ancestors, a living space astride the stream of life that ebbs and flows through the pass, season after season. The mountain peaks along its flanks give refuge to mountain sheep, marmots, arctic squirrels, barren ground grizzlies, and to the irrascible, cunning, titan-jawed wolverines. Wolves, too, range the ridges along the pass, and make regular forays among the caribou herds to pull down the aged, weak, the very young, and sometimes the strongest of the herd.

If stories recounted by the older men may be given credence, little love existed between the Arctic Eskimos and Indians living south of the Brooks Range. Occasionally a hunting party of Indians would venture into the mountain pass or attempt a raid on the tiny Eskimo villages. Such excursions into the land of "The People" resulted in bitter clashes during which blood was shed by both factions. So, blood was no novel sight in Anaktuvuk Pass. It reddened the snow or the meadows, sometimes drawn from human veins, more frequently from those of the arctic deer, the caribou.

Viewed from an airplane throbbing northward nine to eleven thousand feet above sea level, Anaktuvuk Pass is only moderately impressive. Often it is completely obscured by dense layers of clouds and fog. On rare occasions the weather is good all the 435 miles from Fairbanks to Point Barrow, and the craft can be flown through the pass a few hundred feet above the floor of the valley. Then one can look upward on both sides of the hurtling plane at the rocky, steeply sloping, snow-streaked, treeless peaks flanking the pass. Or, on looking down, a passenger with a quick eye accustomed to identifying landmarks from the air, may catch a fleeting glimpse of a small cluster of native's huts, the upturned faces of the Eskimos and their sledge dogs, or rarely the loping forms of wolves trying to escape the roar of the engines.

Whether one flies through the pass or far above it, Anaktuvuk leads northward to the low, rolling foot-

The village of Barrow, Alaska, from the air, after the ice has gone. The Arctic Ocean lies just beyond the village. To the right a brackish lagoon appears just over the top of the Native Service Hospital. (Photo by Dr. W. C. Steere, Stanford University)

hills flanking the northern slopes of the Brooks Range, and out across the flat, lake-pocked land of the tundra where nearly one-half of the surface is covered with water in the summer and the streams meander in broad, lazy loops that nearly intersect themselves scores of times between the foothills and the Arctic Ocean. In summer Anaktuvuk leads northward to wide expanses of soggy tundra; to dense fogs tumbled, but not dissipated, by strong, cold winds; to myriads of yellow arctic poppies and buttercups; to gentle slopes washed heavily with the deep blue of massed acres of lupines; to a land where mosquitoes circle in unbelievably dense clouds; to a land of many surprises and some dangers, where ice is never far away.

The bitter cold seals the lakes and ponds with ice in September. The streams are covered shortly after, and the salty waters of the Arctic Ocean are bridged with ice by November or December – sometimes even earlier. After the first hard freeze in September, the temperature rarely rises to the thawing point again until the following May or June. Temperatures of sixty degrees below zero, Fahrenheit, have been recorded at Umiat, near the northern mouth of Anaktuvuk Pass. It is significant to note that over millions of years the annual repetitions of such low temperatures have spread an icy blanket over the deeper strata of the earth's crust, and only the superficial layer thaws during the short summer. Thus, in midsummer, the thawed ground, within which the roots of living plants are confined, extends downward from the surface only a few inches or at most a few feet. Below this and extending downward several hundred feet the temperature is perennially below the freezing point of water. The term "permafrost" has been applied to this thick layer of perennially refrigerated soil, gravel, muck and rocks.

Permafrost is present throughout all of the area lying between the north slopes of the Brooks Range and the Arctic Ocean, and occurs over extensive areas south of that range, but in less continuous distribution and to lesser depths. In Siberia it is reported to extend to a depth of about 2,000 feet but, so far, it has not been found to penetrate much beyond half that depth in arctic Alaska. It is not definitely known whether permafrost extends out under the Arctic Ocean, or under the larger, deeper lakes of the region.

It has been determined that the annual fluctuations in the air temperatures act directly on the temperature of the substrata in areas of permafrost. By means of thermistors – delicate bits of wire than change their resistance to the flow of electrical current with changes in temperature – it is possible to detect minute changes in the temperature around the thermistor element. Cables into which thermistors have been inserted at intervals are lowered into test holes, abandoned wells drilled in search of petroleum, and other excavations. After a few hours the cables and their thermistors come into equilibrium with the surrounding earth, and by reading the resistance to a standard flow of electrical current furnished by batteries, the temperature of the material immediately surrounding each thermistor can be determined to within about two one-hundredths of a degree! After a properly constructed and calibrated cable has been installed, and

Our farthest north. This is the breakup of the ocean ice off Point Barrow, photographed at 1:30 a.m., June 8, 1952. (Photos by the author unless otherwise credited)

High-center polygons — vertical aerial photo from altitude of 500 feet.

repeated readings taken over a period of months or years, a good deal can be learned about the temperature characteristics of the layers at different levels. Such readings show distinct semi-annual fluctuations in the temperature of the substrata 50 feet below the surface. The amplitude (range) of fluctuations becomes smaller with increasing depth and finally disappears. The lowest air temperatures occur in January and February, but the lowest temperatures about 50 feet below the surface occur in June and July! It takes about six months for the effects of a major change in the air temperature to be reflected in the temperature of the earth less than 100 feet below the surface.

Not all of the manifestations of permafrost are as subtle as temperature changes. The surface physiography of permafrost areas exhibits features that reveal a good deal to the geophysicists and geologists. For example, much of the permafrost area in arctic Alaska has the surface of the tundra strikingly broken into "polygonal ground," a pattern that resembles, on a giant scale, the cracking of drying mud. It is believed that the polygonal pattern in permafrost areas is largely the result of alternate freezing and thawing of the superficial layer. As the mucky, water-logged soil freezes, then continues to cool further until the temperature near the surface may be at zero or below, the colloidal material in the soil shrinks, contraction tensions of considerable amplitude build up, and the soil cracks along the lines of greatest stress. Some of the polygons formed by this cracking are 60 to 70 yards across, but most of them are less than half as wide. After a crack opens, hoarfrost collects in it until a narrow wedge of solid ice extends downward to the bottom of the crack — sometimes many feet below the surface. These ice wedges intersect one another and in the course of a few winters block out the "polygons" which may be square, but more commonly are 5- or 6-sided.

When thawing of the upper layers occurs in the summer, the expansion of the colloidal muck and intermingled vegetable debris causes the edges of the polygon to push upward slightly where they come in contact with the ice wedges and the polygon becomes "dished," with the rim a few inches higher than the central part of the pan. The depression is usually filled with water during the summer and often contains a growth of aquatic plants. Successive seasons

An arctic field camp on the shore of Sungorak Lake, about 18 miles south of Point Barrow camp. Almost constant winds put a severe strain on tents. The "weasel's" tracks crisscross the tundra near Barrow.

of freezing cause still further contraction, splitting of some of the ice wedges or of the mucky soil along new lines of contraction stress, followed by increases in thickness of the ice wedge. With the next thaw the expansion thrusts the rim still higher until eventually it is pushed straight up and overturned toward the center of the pan. When these successive processes continue over long periods the central part of each polygon may become a hummock, with ice wedges underlying the ditches between the hummocks. The terrain in such areas is rough and difficult to negotiate, even with track-laying vehicles. The depth of the ditches depends on the age of the polygons, and on the relation of the area to good drainage. If drainage is good, the ditches may be as much as six feet deep, but more often it is only two or three feet from the top of the hummock to the bottom of the adjacent ditch.

The vegetational cover on young, low-center polygons is different from that on the older, better drained, high-center polygons or hummocks. The water-filled pans support a growth of sedges, grasses, water buttercups, and narrow-leaved cotton grass. The amount of humus in the soil in these pans usually is comparatively low and the layer that thaws in the summer is rarely over a foot thick. In contrast, the hummocks support an entirely different series of grasses, arctic willows, yellow arctic buttercups, poppies, saxifrages, and arctic colt's-foot. The soil forming the hummocks is a churned mass of mucky clay, silty material, and partially decayed peaty plant remains. The drainage from the hummocks makes the soil there less soggy than that in the bottoms of the drains or in the pans of the low-center polygons. There is a difference, too, in the relative acidity of the soils in the two habitats. The soil in the low-center polygons is usually much more acid than that on the tops of the hummocks.

Some of the higher hummocks in the vicinity of Point Barrow support much darker green, denser mats of vegetation than is found on adjacent mounds. These dark green, densely sodded mounds are the hunting and roosting stations of the great snowy owl, and there is no doubt that the richness of the vegetation covering them is directly traceable to the higher content of nitrogenous and phosphate material contributed to the soil by the roosting and feeding birds.

In some areas there is a close correlation between the artificially enriched character of the soil and the presence of certain species of mosses. In most parts of the arctic and subarctic regions of North America the moss, *Splachnum,* is found only in very small colonies, and each of these colonies practically always grows on the decayed body of some small animal or on bones or excreta of larger mammals. But in the vicinity of old village sites in arctic Alaska, where Eskimos lived for long periods, large quantities of animal matter accumulated around their dwellings and in the ice pits where they stored their meat, fish, and blubber. Through centuries meat and other materials rich in nitrogenous and phosphate compounds were leached by the melting snow and the rains of summer. The liquor formed in this process collected in depressions, some of which covered several acres. After this artificial enrichment had been carried on for an undetermined number of years, the soil provided a suitable substrate for *Splachnum* and one or two similar mosses. Consequently, the swales near ancient dwelling sites often support fantastic amounts of these highly specialized mosses. In some places they cover the ground almost to the exclusion of all other plants.

There are higher plants, too, that can be used as indicators of the type of soil on which they grow in arctic Alaska. One grass grows best in water from a few inches to three feet deep. It has rather stiff, erect stems with a few broad leaves near the top. If the muck in the bottom of the pond and the water in

↑ High-center polygons near Point Barrow Camp. The white buildings are instrument shelters used in an investigation of microclimatic conditions among the hummocks. Arctic Ocean at top of photograph.

▲ **Typical tundra near Point Barrow, Alaska. Hummocks in foreground and into middle distance, marshy flats beyond hummocks.**

➔ ***Potentilla emarginata*** **invading bare ground of a "frost boil," an area where freezing pressures squeezed mud to the surface, to overflow and bury older cover of vegetation.**

which it stands have an acid reaction, the leaves of this grass, *Arctophila fulva,* are a distinctive blue-green. If, on the other hand, the pond contains water with a neutral or slightly alkaline reaction, the color of the grass is a bright orange-red! Of course, the presence of either the blue-green or the orange-red plant in and around shallow ponds is a warning to operators of earth-bound vehicles, for the soft, sticky mud provides poor support for tractors and "weasels."

The thin layer of soil that thaws each summer is known as the "active layer" and it is within this restricted blanket of soil that occurs all growth of roots, terrestrial insects, and other forms of soil-dwelling life rarely over 12 or 15 inches deep. On the higher, more thoroughly drained hummocks or on the sandy banks of rivers, the thawing often extends to three or four times that depth. In the northernmost parts of the Alaskan Arctic the hummocks thaw more deeply when the surface has been denuded of vegetation than they do if the insulating cover remains intact. When the plant cover is present much of the solar energy falling on the surface is absorbed by the plants in the processes of converting raw materials into sugars, so less of the energy is available to warm the soil. Also, the dark brown or gray to nearly black soil absorbs heat much more rapidly than lighter surfaces, and hence accelerates thawing.

Flowering plants growing on the tundra make the most of the thin layer of soil available to their absorbing rootlets. When thawing begins in early summer, young rootlets quickly emerge from the older, overwintering root-stocks, and follow the retreating frost-line into the soil. Within a week after the first inch of soil has thawed rootlets are often a quarter of an inch

▲ ***Saxifraga hirculus,*** **an attractive yellow flower common in low-center polygons.**

➔ **Nest and eggs of Baird's sandpiper near the Point Barrow camp.**

long! As the thawing continues, the elongating rootlets keep pace with the deepening active layer, and their tips are rarely over an inch behind the retreating zone of solidly frozen soil. The roots of most arctic plants can grow in soil that is only a degree or two warmer than the freezing temperature of water.

Another fascinating feature associated with the rapid growth of the young rootlets is that most of the increase in length during the first three or four weeks of growth is brought about by the elongation of the minute cells that had formed within the rootlet while it was still buried in the outer tissues of the older root. This can be demonstrated by staining sections of the root tips so as to show the presence of actively dividing cells. Microscopic examination of slides prepared from rootlets collected in June and July rarely reveals more than a scattered cell here and there in the process of division. The growth during the early summer is primarily that of increase in size of pre-formed cells, not that of increase in number of cells. In August, on the other hand, the rootlets exhibit numerous actively dividing cells, for by that time the pre-formed cells have elongated to the limit of their capacity and new ones must be formed if additional growth is to occur.

Numerous intriguing little animals live among and upon the plants of the tundra. Two different kinds of lemmings, little chaps with voracious appetites and looking like field mice of the temperate zones, populate the tundra. One, the brown lemming, is similar to the one that periodically migrates in hordes into the fiords of Scandinavia. It lives in marshy, level parts of the tundra, snips stupendous quantities of grass and other plants for food, raises large families and gradually builds up its population until the entire countryside is swarming with lemmings. Then some mysterious set of factors combine to decimate the lemming population and the animals almost disappear as though a deadly epidemic had smitten them. Such a "crash" in the lemming population occurred in June 1949. The following summer and during the summer of

Mr. and Mrs. Stalker and some of their grandchildren. The Eskimos live in frame or sod houses during the winter, in tents in the summer time.

1951 lemmings were scarce in arctic Alaska. But not all perished. A few escaped and slowly began to rebuild the population. By the middle of June 1952 the number of brown lemmings in the vicinity of Point Barrow had increased probably a thousandfold over that of the previous summer. Present indications, in April 1953, are that the population will reach a "high" in the early summer of this year. Probably, too, there will be a crash in 1953 and the cycle of depletion, resurgence, and another depletion will have reached full circuit within four years.

The inter-dependence of nature's children is remarkably demonstrated during these cyclic fluctuations in the populations of the lemmings. During a year of abundance among the lemmings the predatory animals are numerous too. Foxes, weasels, owls, jaegers, and falcons are numerous and all these predatory species reproduce normally. When the lemming population goes into one of its cyclic declines the predators breed and produce some young during that year, for they had already begun the reproductive cycle before the "crash" removed their main food supply. But the next year the predators breed only rarely.

For example, in 1950 and 1951 weasels were almost never seen on the tundra; the fox population was low and very, very few dens contained kits; both jaegers and snowy owls were present in moderate numbers but virtually none of them nested; falcons were seen near Point Barrow only two or three times during the entire summer. There were not enough lemmings in the country to convert vegetable foods into proteins and other materials that make up red meat, and the predatory birds and mammals starved. Among them, famine all but eliminates reproduction.

The lesson continued vividly during the summer of 1952. Then there was a fair abundance of lemmings. Nesting jaegers and snowy owls were numerous. Falcons, although they nest much farther inland, were

seen frequently. Foxes were more numerous and during the fall and winter of 1952-53 the native trappers took many fine fox pelts whereas the previous winter they had hardly found it worth setting their trap lines. The Eskimos this spring say that there will be lots of predatory birds this year – there are lots of lemmings on the tundra now! They even predict that this summer will bring many walrus and *ugruk* (bearded seal) to the waters around Point Barrow, for, they say, when there are lots of lemmings on shore there are many walrus on the ice floes out at sea! How do they know? When asked, they shrug their shoulders and say, "It has always been that way. Lots of lemmings, lots of walrus!"

Another kind of lemming, the collared lemming, is much less numerous in arctic Alaska than the brown coated one. The brown lemming stays brown the year year around. The collared one is brown in the summer, but white in winter. The two central claws on the toes of his front feet become greatly modified, too, for with the onset of winter they become much heavier, thicker, and notched at the tips. These heavy claws probably aid the energetic little animal in digging through the snow to the plant food upon which his life depends. Both the brown and the collared lemmings burrow beneath the snow, but the collared comes out on top much oftener than the brown during the winter months. The brown lemming lives on the marshy flats; the collared one prefers the gravelly ridges and tops of the larger hummocks where he gets his feet wet less often than the brown fellow. They compete only slightly for food and living space.

Arctic squirrels, similar to the ground squirrels of California, but with shorter, less bushy tails, occupy sandy areas where drainage is good. In such habitats they dig extensive tunnel and nesting systems three or four feet beneath the surface of the soil – only a few inches above permafrost. These squirrels crawl into their burrows shortly after the first hard freeze in the autumn, dig into the center of a wad of grass previously stored in anticipation of the winter's cold, coil their tails over their inwardly rolled noses, and go to sleep. They stay right there until the following April or May! During the period of hibernation their metabolic rate drops tremendously, their heart action is so feeble that it is difficult to detect a pulse with a stethoscope, and breathing is practically imperceptible. With the onset of spring they emerge from their winter nests, move about sluggishly for a few minutes and retreat for hours upon hours of more sleepiness. Within a few days, however, they become more active, seek tufts of grass above the snow and burrow beneath it for added food. During hibernation and when they first emerge from the winter nests these squirrels draw heavily on the fat stored lavishly on and within their own bodies. If several hibernate in the same burrow system, the first one awake sometimes practices cannibalism. One early riser in a cage at Point Barrow ate two other squirrels nesting with him!

The larger animals of the region – land-dwellers, that is – are the caribou, which comes within a few miles of populous Point Barrow during the summer months; polar bears that live most of their lives on the ice floes and in the winter are followed scores of miles offshore by arctic foxes who pick the bones of seals killed by the larger carnivores (the writer saw the tracks of a pair of foxes paralleling those of a polar bear over two hundred miles north of the nearest land); arctic foxes that have snowy white coats in winter and bluish gray ones in summer; red foxes that carry the same colored pelt the year around. Inland a few miles occur the powerful arctic wolves, some of which attain a weight of eighty pounds or more; scattered barren ground grizzlies; northern marmots; and the vile-tempered, mischievous, larcenous wolverine. Polar bears have been shot inside the entryway of houses in Barrow Village when they attempted to raid the supply of meat stored there. Barren ground grizzlies sometimes acquire a taste for foods intended for field parties and have to be destroyed to prevent them from completely consuming the field party's supplies. The squirrels are trapped by the Eskimos for their pelts, for a squirrel or "sik sik" parka is a light-weight, warm, beautiful garment. Marmots, called "sik sik puk" are also sought for their skins with which to make parkas. (The "puk" merely means "big" sik sik). The name "sik sik" was applied to the arctic squirrel in imitation of one of his whistling warning calls.

The fur of the wolverine is highly prized for trimming the hood of the parka, for the frost that accumulates from one's breath can easily be brushed away from wolverine fur, while it sticks to most other furs and mats it into an icy mat that endangers one's cheeks and nose to frost bite.

The Eskimo people who sparsely inhabit the coastal strip north of Anaktuvuk are cheerful, ingenious in making the most of limited resources, thoroughly likeable folk. They, and their inland cousins in Anaktuvuk Pass, laugh often and heartily, both at others and at themselves. They know the ways of the north and adapt their way of life to its rigors. Some of their customs are difficult for the intruding whites to understand. But we whites have pushed into their land of long winters and summer days of continuous light without their invitation, yet they have met us with friendliness. Today many of them are skilled workmen with white men's tools. Some of them handle heavy mechanical equipment nonchalantly and efficiently. In Alaska's Arctic they are "The People." We are the outsiders, the intruders, with whom they coöperate and whom they willingly teach their lore when we meet them with open minds and without prejudice. I respect and admire many of them! END

MOUNT McKINLEY: aerial photograph by Bradford Washburn

➔ *(Next two pages)* **Looking westward from an altitude of 10,000 feet across the entire central part of Mount McKinley National Park with the 20,300-foot peak 70 miles away. Photographed in mid-September (infrared filter).**

GLACIER FLIGHT

—An Aerial Reconnaissance of the St. Elias Range

G. DALLAS HANNA

MALASPINA! Hubbard! Guyot! Agassiz! Bering! Muir! Martin! Famous men, the average reader will say. Famous glaciers? Never heard of them? Probably not. They are off the beaten track followed by the tourist, although most of the tourist steamers pass within a few miles of these mighty rivers of ice. They originate in a part of the coast range of Alaska mountains which extends from Mt. Fairweather to Cook Inlet and which is on most maps the "St. Elias Range."

The range takes its name from Mt. St. Elias, one of the celebrated peaks of the world and well known to all navigators of the North Pacific. It rises almost directly from sea level to 18,008 feet and on clear days is visible to mariners at sea more than one hundred miles away. There is a very narrow coastal plain, covered to a large extent with solid ice 1,000 feet or more thick.

In 1938 I was a member of a geological party sent out by the Associated, Standard, and Union Oil companies to make an investigation of the area. The rocks forming this mountain front are sedimentary, and in the course of the work it developed that we needed to know what kind of contact existed where the mountain front joined the precipitous slope of the mountain itself. Was the great range pushed up through and possibly over the sediments or did the latter merely accumulate in shallow waters along an ancient continental shore? The answer to that is a story in itself.

From a distance in the air we had already seen the ruggedness of the terrain, the impossible ice falls, crevasses and lakes, so we knew that an overland journey was beyond our ability in the time allotted to the problem. The best alternative under such circumstances is to fly over the area and photograph it. This task fell to my lot.

Through a fortunate coincidence, the one who has done most to make the rugged nature of Alaska scenery known in an authoritative manner,

and who is himself a master physiographer, Bradford Washburn, was working in that part of the country the same year for the National Geographic Society. He was very desirous of seeing and photographing this part of the coastal range, the only remaining portion he did not know from personal observation.

Accordingly we joined forces and engaged Harold Gillam, pilot, in Cordova, 150 miles distant from St. Elias but the closest point to serve as a headquarters.

Flying straight down the coast we gradually gained altitude until 15,000 feet was reached when we were directly in front of the stupendous mountain itself. At times it seemed that we could almost reach out and touch the jagged rock walls, so windswept not even snow would adhere to them. We headed inland after we had passed the topmost pyramid, crossed the abutting narrow ridge up which the Duke of the Abruzzi slowly trudged to the summit in 1897, leading the only party which has thus far accomplished the feat.

Very unexpectedly we found ourselves cruising along over a broad, undulating expanse of plateau ice. To the northward a few miles was the massive, nearly flat-topped Mt. Logan, somewhat higher than St. Elias, and one of the most majestic of all the northern mountains, notwithstanding which few people have ever heard of it and fewer still have seen it. To the eastward this table-land of ice extended well toward Yakutat Bay and to the westward to Copper River, constituting an ice cap which fills a basin between two ranges of mountains and spills out through passes as mammoth glaciers on every side.

These are not small rivers of ice comparable with those of the Alps. For instance, Bering and Steller combine in their lower part to make a solid moving mass 50 miles across. Guyot discharges directly into Icy Bay, the front being several miles

(Left) **Guyot Glacier, flowing seaward to the right, divides around the Guyot Hills, merging to fall into Icy Bay. Two of North America's greatest mountain massifs stand on the horizon — Logan (19,850 ft.), highest peak in Canada, to left; St. Elias (18,008 ft.), in Alaska to right.** ***(Above)*** **Looking up Bering Glacier from the southwest, with an ice flow spilling out through a gap to the side. The main flow is out of the picture to the left. (Photos by Bradford Washburn)**

across and at least 300 feet above the water line. Malaspina is over 40 miles across.

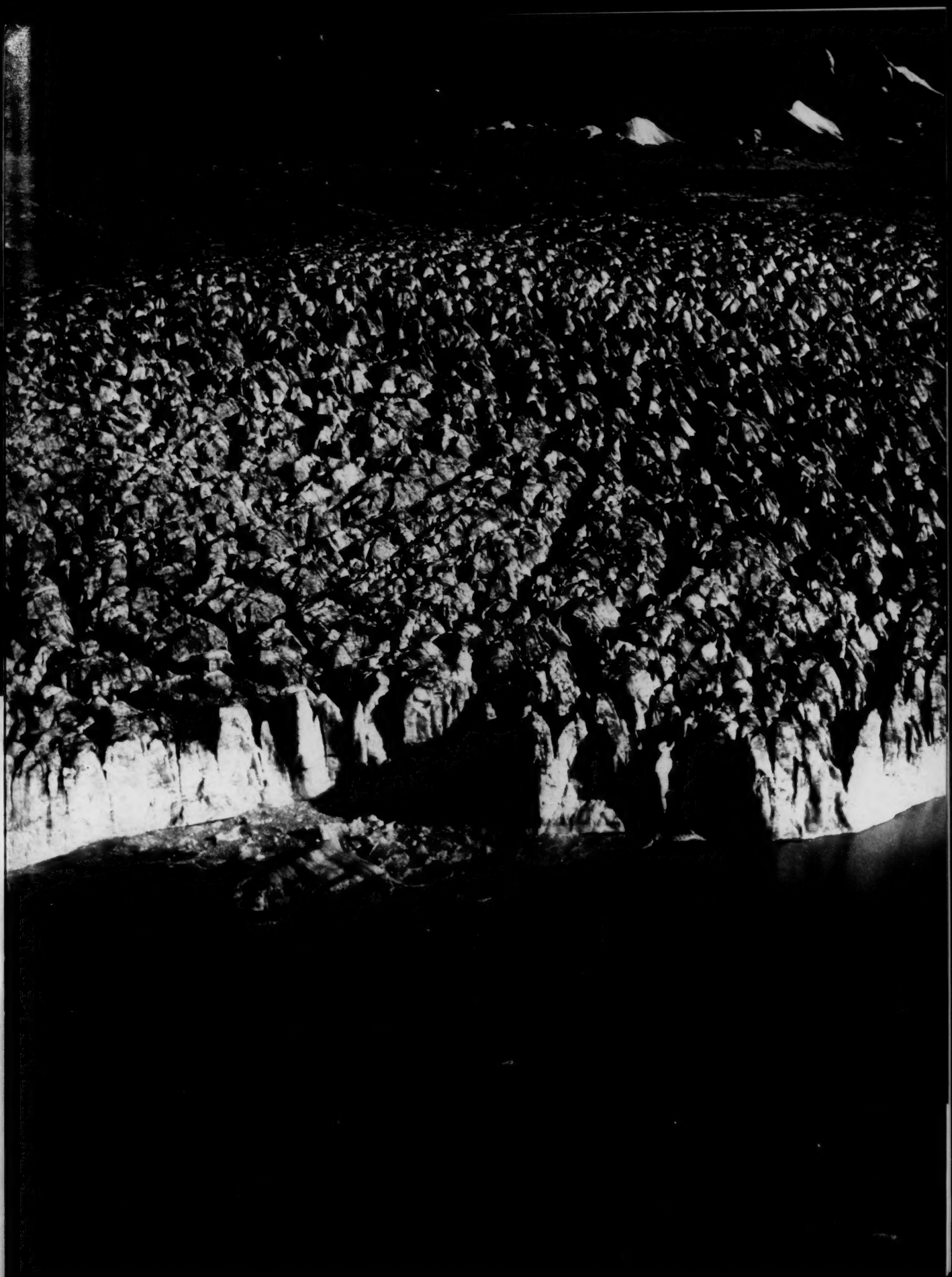
While we were up there we thought we might as well go on around Mt. Logan and see what was on the Yukon side. There we cruised alongside a great cliff, so nearly vertical snow will not cling to it, dropping 10,000 feet from the top of the mountain down—down—down into the depths of a great canyon so far below us we could not estimate the distance with any approach to accuracy.

Tens upon tens of thousands of square miles without a living soul! The solitude of it all, on that beautiful sunny day, aroused the prospector in us; we should have liked to stop and prowl around a bit but that was not in the instructions.

So we turned back around the west end of Mt. Logan, leaving Mt. Lucania, the scene of some of Washburn's hardest labors, in the distance to the eastward. Again we crossed the ice cap and passed close to the northwest shoulder of St. Elias. It was up this ridge that members of the International Boundary Commission attempted to climb the mountain during the survey of the Alaska-Canada boundary. They were not primarily interested in reaching the summit for the reason that mountaineers climb difficult slopes, but they wanted to put up a stake and take some theodolite shots. The top of the peak is the termination of the boundary line coming southward from the Arctic Ocean and following the 141st meridian. Thence southward the boundary follows the irregular crest of the range. That party camped a few days within reach of the summit but cloudy weather prohibited survey work.

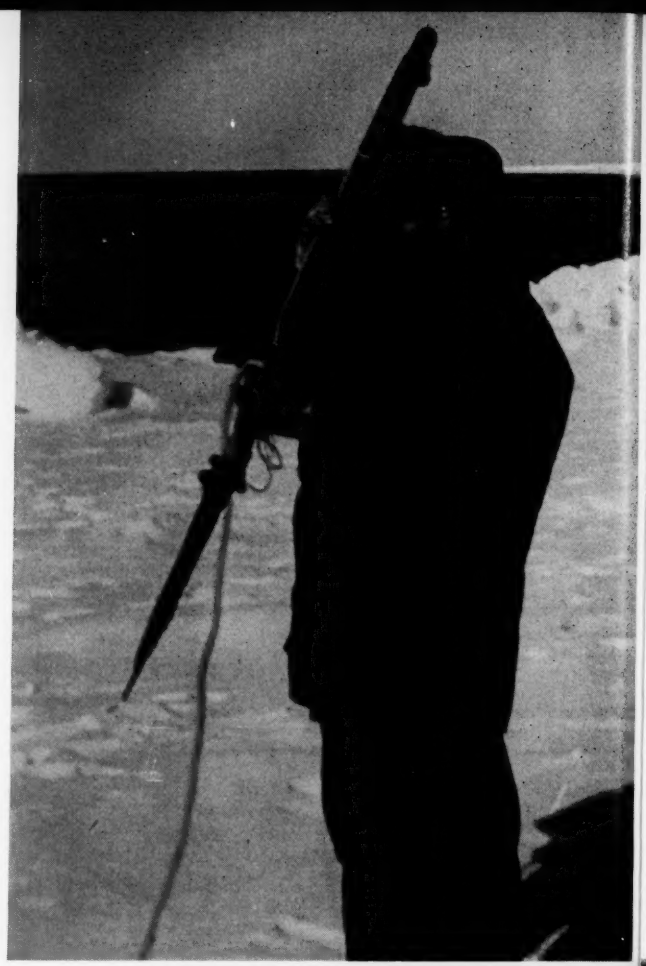
This vast area of rugged mountains and great glaciers, only the major features of which have been explored and named, offers fascinating opportunities to those interested in natural history, geology, mountaineering, winter sports or just plain pictorial photography. **END**

(Above) **The seacliff of Guyot Glacier (white, to left) was about 400 feet above Icy Bay when we flew over it. Snakelike, Tyndall Glacier flows down to meet Guyot. Visible all the way from its source on Mt. St. Elias, it has its lower end blackened with rock debris carried down from the mountainsides (G. Dallas Hanna).** ***(Right)*** **Miles Glacier flowing into a lake near Cordova is a tourist attraction. We flew close so the vibration of our propeller and engine would crack off the berg that has just fallen into the lake. (Bradford Washburn)**



The Hunted and the Hunters

ROBERT F. SPENCER



Barrow Eskimos still use the harpoon.
(Ira L. Wiggins)

NATURE is made up of the hunted and the hunters." This rather unexpected statement, in English, was made to the writer in the course of the bloody business of butchering some twelve huge walrus carcasses out on one of the moving ice floes of the Arctic Ocean. The speaker, an Eskimo hunter, was not merely voicing a platitude; it was plain that his sentiment was based on the careful observation, through his lifetime, of man's struggle to live in a hostile arctic environment.

Any ethnological study* of the Far North must take particularly into account the relation of man to nature. More so, perhaps, than any other of the arctic peoples, the North American Eskimos – the scattered groups of men living between the extreme northeastern tip of Siberia and the fringes of Greenland – have succeeded in making a superior adjustment to their surroundings and in exploiting nature. This is not to say that the cultures of the various Eskimo groups – one would scarcely be justified in calling them tribes – are caused by environment. Nature is a limiting factor and the response of the Eskimo to the restrictions of his surroundings is truly remarkable. There is a good deal more to the ancient culture of the Eskimo, not to mention his society today, than can be explained merely in terms of material adjustment and subsistence.

Eskimo culture, the society and its related institutions, is not a simple thing. There is a complex system of interrelationships between individuals, resulting in an elaborated series of coöperative patterns both within and without a highly evolved family system. Formerly – and still, with some of the Canadian Eskimos – there was a complicated religious system in which ritual and ceremony played a significant role. Eskimo society, particularly in Alaska, under the impact of settlement by outsiders, is changing and will continue to change. But even though Christianity has replaced the older ceremonial life, even though "guns and but-

*Ethnological studies at Point Barrow were aided by a contract, N ONR 710 (03) between the Office of Naval Research and the University of Minnesota.

A very unusual scene near Point Hope, Alaska. For some unknown reason a huge herd of walrus has come up on the beach, easy prey for Eskimo hunters. An Eskimo who saw this picture said it was a very strange sight for him to see so many walrus at once. (Machetanz photo from Three Lions, New York, courtesy *Alaska Sportsman*)

ter" reflect material innovation, there is much that cannot be displaced if the Eskimo is to continue to struggle independently against the natural forces.

A case in point is provided by the contemporary situation of the Eskimos of Barrow, Alaska. During the summer of 1952, the writer, a cultural anthropologist, carried on a series of investigations in this village in order to see to what extent these Eskimos retained their old behavior patterns in the face of a changing society. Change is reflected in the presence of a naval installation near the village which employs able-bodied men from the community and which has also become an attraction to people of other villages. One result is that the population of Barrow has swelled to somewhat over one thousand. Another is the introduction of money, replacing the old barter economy — the goods and services associated with money have become available in full force. In the last few years two motion picture houses have been opened in the village, two coffee shops have made their appearance, and, not to mention new shops that have been opened by Eskimos, the old trading post has become a modern emporium, stocked with canned goods, soft drinks, and clothing. As air travel has opened up the Arctic, the Barrow Eskimos and others like them have been drawn more and more into the modern scene.

The social scientist knows that not infrequently, when a racial or ethnic minority is drawn into contact with the mechanized world of today, it may suffer considerably. A change in material culture, for example, may establish a chain reaction of change throughout the entire society. "The better mousetrap" may cause modifications in time honored ways of solving problems and these, in turn, may modify social organization and religion. Many of the American Indian tribes in the United States have become deprived rather than enriched because of technological change simply because their institutions and ways of life were not equal to adjusting to the new ideas. In Africa, Australia, and New Guinea there are other instances reflecting the axiom that culture contact is not always beneficial. But is this true of the Eskimo? Apparently not, since at Barrow, at least, the impact of modern technology and other institutions has been carefully explored by the natives themselves. The social hybridization which has resulted indicates the significant ability of the Eskimo to become a democratic citizen of the modern world without the loss of the dignity and integrity which characterized the group of old.

Barrow today is a well defined, adjusted community. An elected community council effectively deals with the outside world. There is the Alaska Native Service school and hospital and the active Presbyterian church. Although the public health picture is clouded by the ever present tuberculosis (as an ethnic in-group, the Eskimos have not yet developed adequate resistance to the diseases of the white man), steps are being taken to relieve this menace. The community has no crime problem, and juvenile delinquency, despite the movie and the ubiquitous comic book, is virtually unknown. By its own choice, Barrow has voted itself Dry. The question is frequently asked — "Do the Eskimos still live in igloos?" The answer is affirmative, since *igdlu* simply means "house." Actually, insulated frame houses are the rule today and have replaced the old sod house with its whalebone beams. The dome shaped lodge of ice is still in use, not, it must be said at once, as a permanent dwelling — it never was — but as an overnight shelter while traveling in the grim arctic winter.

Thus Barrow is a modern community but its modernity is something of a veneer. Beneath the façade of the motion picture theater, the ability to speak and write in English, the devout Christianity — realities, it is true — lies the starker reality of life in the Arctic. It may well be said that community adjustment in Barrow depends far less on the innovations brought by contact with the culture of the white man than on the retention of ways of coöperative living derived from the untrammeled native past. The complex extended family, with its elaborated series of reciprocal obligations between kin, still remains and the individual's life is enriched by close coöperative ties with brothers, uncles, and cousins. It seems safe to predict that the Eskimo will remain balanced and integrated as long as the family system remains intact. And despite the air age, Barrow is a long way from being dependent on the outside world for its subsistence. To fly food into the area is still without purpose so long as it is possible to live on the rich arctic fauna.

It is this aspect of modern Barrow life which perhaps best points up the reality of the culture of the Eskimo of today. Both for the men who hunt and the women to whom the task of preparing food and clothing falls, the activity of the food quest is a primary drive. A man may work for the government installation in the area and be well paid for his labor but his first interest continues to lie in the chase. The money which he earns, moreover, must be spent largely to buy meat, blubber, and oil for himself and his family from those who devote their full time to hunting. The effects of this process are to distribute the new commodity of money throughout the community and to retain the older, pre-white-contact dietary habits. From the point of view of hunting, we can see how well the older culture patterns have withstood the inroads of modern society.

The location of Barrow, at the tip of a marshy peninsula, points toward maritime activity. The pre-contact cultures in the Barrow area, as revealed by archeological investigations, were directed toward the sea and the quest, not of fish but of sea mammals, which still remains paramount and underlies economic life and subsistence pattern. Unquestionably, the most important sea animal hunted is the whale. It can be readily seen that the flesh of the huge baleen whales stands to provide considerable food over a long period of time. And indeed, in the older culture, much of the group activity in ritual and ceremony rested in what might be called a "whaling cult," a complex series of religious activities designed to make the whale more amenable to capture. But even today, although the memories of the proper whaling ritual remain to only a few older men, even though the power boat has replaced the *umiak*, the great hunting canoe, in such expeditions, and even though the darting gun and the bomb have rendered obsolete the slate-tipped lance, whaling is still the most dramatic activity. But a whale's habits may vary; not since 1951 have the Barrow people taken a whale. Expeditions went out fruitlessly in the spring and fall of 1952 and it was a disappointment that no *nálukatak*, the blanket toss and tug-of-war signalizing and celebrating the taking of a whale, could be held.

But 1952 was a good year for other kinds of sea-mammal hunting. Seals were obtained in fair numbers, not only the smaller varieties, but the giant bearded seal, or *ugruk (Erignathus barbatus)*, as well. These, with walrus, and an occasional beluga (a small white whale), constituted most of the year's activities at sea. The Barrow Eskimos, however willing to adopt modern methods of hunting, have been reluctant to abandon their time-honored customs relating to coöperative effort and the division of game. They have been careful to ensure an equality of distribution and

they continue to preserve the old ways of classifying game. The smaller seals, for example, hunted individually, as through a breathing hole in the ice, are individual property and are not shared. The bearded seals and the walrus, however, are taken by the joint effort of a boat crew and are *úmeaktuwat,* that is, they are divisible into equal shares for all who have participated. This is not quite so simple as may at first glance appear; the methods of selecting a boat crew, the allotment of duties and responsibilities to crew members, require detailed sociological analysis.

Hunting among the Barrow Eskimos may perhaps best be described by taking you along on a hunt. A venture after walrus points up the adoption of new methods but at the same time reflects the survival of older Eskimo ways. Beginning most frequently in July, although there are records of its occurring somewhat later, the pack ice begins to break. As it does so, it moves northward along the western shores of the Barrow area carried by currents. At this time herds of walrus can be found congregated on the moving floes some distance from shore. Bearded seals and polar bears are also floating on the broken ice. While the latter are hunted and taken when found, the walrus are most profitable. Both seals and bears are taken as single specimens, but the walrus appear in herds of as many as fifty animals.

The village of Barrow has several launches—one could scarcely dignify them by the name of power boat – individually owned and replacing the skin-covered canoe of the past. The boat owner is free to choose the men to go on the expedition – there is no shortage of volunteers – and has to say when and in what direction he will go. Just as in the past, the boat owner, or "captain," must see to the feeding of his crew while afloat. They bring their own guns, but he supplies the ammunition.

Once under way, after launching the boat into the still, cold waters of the Arctic Ocean, the steersman heads into the floes. The first business is to get some meat to add to the bread and coffee the captain has provided. All hands try to spot a bearded seal. It is usually not long before someone sees an ugruk sleeping on a floating slab of ice. With the engine at slow speed, the craft moves quietly, inching its way toward the prone animal. But the unfamiliar sound soon catches the seal's attention. As he raises his head, three or four men in the bow of the boat open fire. Now there is some anxiety lest the animal, merely wounded, may

The walrus hunt. ***(Above)*** **Firing at the walrus.** ***(Center)*** **A "tug-of-war," hauling them up onto the ice.** ***(Below)*** **Butchering the huge carcasses. (These photos by the author were taken between 1:00 and 2:00 a.m., arctic summer, f3.2, 1/10)**

Ruins of an Eskimo meat storage cellar. "Timbers" that once supported the sod roof were all made from the larger bones of whales. This cellar is within fifty feet of the northernmost tip of land in Alaska, at the extreme end of Point Barrow. (Ira L. Wiggins)

slip into the water and be lost. The helmsman accelerates, while in the bow two or three agile men prepare to make the jump onto the floating ice and to secure the catch. The tension is suddenly over and the crewmen pull with a will, using the tug-of-war technique to get the prize aboard. This is no small task, since some of these seals may top 600 pounds. A crewman skilled in butchering quickly takes the seal's short-ribs and the heart, as well as the blubber surrounding the area, and the gamy meat and soft, sweet blubber are set boiling on the camp stove in the hold. Now the more serious business of walrus can be considered.

The men take turns at watch, using the glasses which a more affluent captain may have brought, as the boat makes its tortuous way through the immensity and silence of the broken ice. It may be hours, even several days, before walrus are sighted. There is tension and expectancy but there is also infinite patience. Even before the walrus are sighted, evidences of their presence on the ice are sought – their droppings, bits of chewed and regurgitated shell, or the melted recesses where their heavy bodies have lain. At last, a walrus herd may come into view. Often hard to pick out in the blues, whites, and grays of ice, sky, and ocean, the walrus lie prone, inert, scrambled one over the other on floating ice blocks. Now and again the sound of their bawling and roaring may reach the boat, and as the craft approaches it is possible to see an undulating movement among the huge, packed bodies as one shuffles over the others to make his dive for food, or as another, surfacing, regains the ice floe and pushes his way among his sleeping fellows. Occasionally, two may be seen fencing with their tusks and the many scars on the bodies of some of the older warriors attest to a long life of battles. As the boat approaches downwind from the resting herd, the picture becomes clearer, the elephantine bodies of the walrus more distinct, and the two-foot tusks catch the light. The Eskimo hunters are again tense and alert. The men line up in the bow of the boat and stand on the cabin, rifles ready. Again the boat reduces noise and speed. It tries to come as close as possible, proceeding slowly until the walrus "sentinels" bawl out a warning and make for the water. Precisely at this moment the men fire shot after shot into the packed bodies and the slaughter begins.

The hunters aim for the head and the underside of the neck of the animals – it is said that the hide can turn a heavy bullet. Many of the animals, wounded, make for the water and dive. Others, more badly injured, may be unable to submerge and so can be picked off in the water. Those re-

maining on the ice can be readily dispatched. From a herd of as many as thirty-five walrus, five to ten, rarely more, may be taken. The boat now throws a line to the ice floe, the men come ashore, and the business of butchering begins. If the captain has been foresighted, he may have a skiff or an umiak in tow. In it, other men may seek to harpoon the remaining wounded.

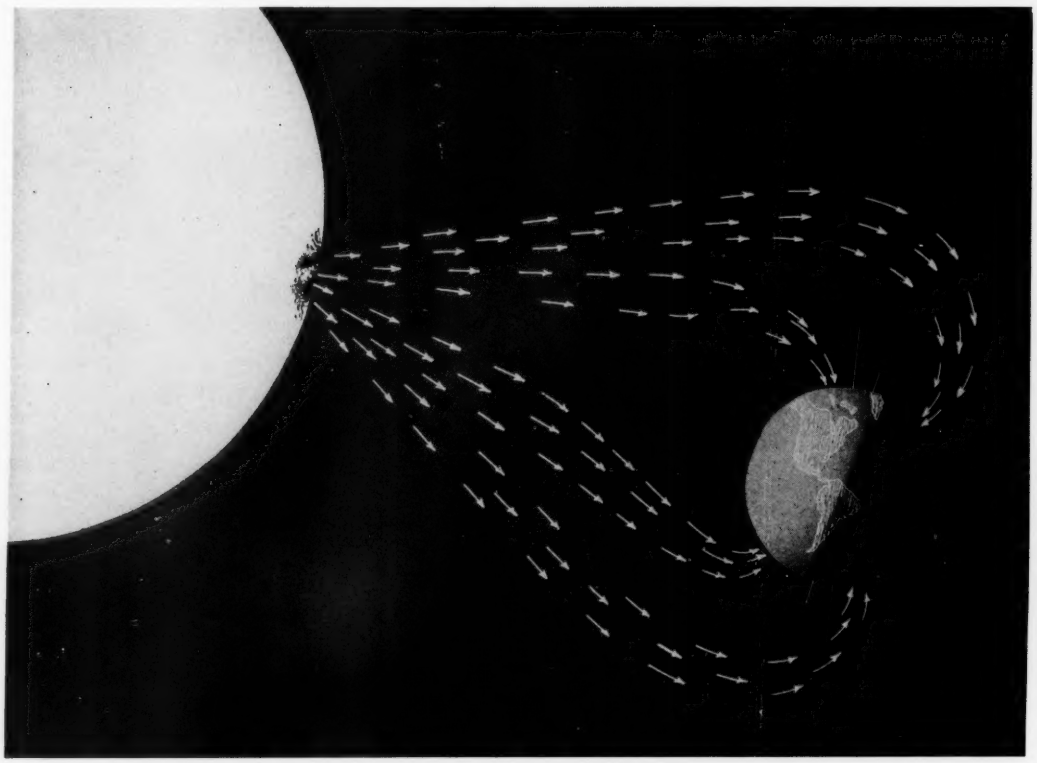
The walrus must be butchered where it is taken. Sometimes bladder floats, of sealskin, may be attached to the carcass which can then be towed in to shore. This, however, is impractical if the hunters are 40 or 50 miles out to sea; it is then considered better to butcher the walrus on the ice. This is done with axes, the meat being hacked apart. First the flippers are removed, then the head, and the carcass is sectioned. Often the paunch is cut open to see if the walrus has recently been feeding. Since the animal is a carnivore, subsisting mainly on shellfish, the stomach may be filled with mollusks, all neatly shelled by the grinding, highly specialized molars. If the meal has been eaten recently, and the digestive juices have not begun to work, the mollusks are suitable as human food. It is a back breaking task to get the heavy chunks of meat aboard. The footing is slippery on the ice and in the walrus dung and blood. Patiently, the Eskimos pass the meat from man to man and the steaming, bloody pieces are loaded into the hold of the boat. At last, after many hours, the men are spattered and bloody, bone weary, but aware of work well done. They leave behind a bloody sea as they turn shoreward.

But such an expedition is not yet successful. If the danger of being swamped by the death throes of a mortally wounded walrus is overcome, if accidents on the ice have been averted, a sudden squall may still threaten the venture. A sudden arctic storm may force them to jettison the cargo. Human life comes first so the crew won't hesitate to discard the tons of hard won meat if the 30-foot boat, often loaded to the gunwales, is threatened by weather. But if the beach can be gained, the old walrus hunter's cry of *wuwuwuwuwuwu!* marks the end of a successful hunt.

The methods of hunting this writer has observed may at first glance seem wasteful and inefficient. It is true that in the course of hunting the walrus, the various seals, or even the whale, there is the constant threat of loss of the game. It is clear, however, that the Barrow Eskimos do the best with what they have. The fear has been expressed that under such treatment — where presumably no member of a walrus herd which has been attacked can escape unwounded — the walrus will face extinction. This anxiety appears groundless since studies at the University of Alaska show quite clearly that the walrus taken by these methods are males. It is apparent that the cows and their calves summer along the Siberian coasts and in the Wrangell Island area. Nor do the native Siberians seem to hunt the walrus as intensively as the Eskimos of the Alaskan Arctic Slope. Probably somewhat more efficient methods of hunting all of the various types of sea mammals could be introduced among the Barrow Eskimos. But there is still the problem of approaching a sleeping herd of walrus as noiselessly and as delicately as possible or of getting a harpoon into a whale in the off-shore ice. A larger craft would obviously not be practical. It is the boat that remains the source of livelihood and which, with the dog team and sled, stands between the Eskimo and starvation.

From spring to fall, modern Barrow, whatever its other work, carries on its hunting. The men turn from one expedition to the next, quick to watch the moving ice and the game it may bring. Even on land, the watercourses along the tundra are navigated in search of the herds of caribou, another important source of food.

Whale and seal, it is true, are the preferred foods in the Eskimo diet. Caribou and fish also, the latter taken in the summer months in the inland lakes and streams, form a significant part of Barrow fare. The walrus, though much of the animal is eaten, is less well liked and to a large extent is reserved as food for the dogs. And since travel in the arctic winter is possible only with team and sled, care must be taken to keep the sled dogs hardy. The Eskimo diet is unquestionably wholly adequate, provided each man gets his share of oil. Meat is not enough but a proper balance is possible when meat and the rich oil-bearing blubber are eaten together. A grown man may eat as much as seven pounds of meat per day and a healthy dog will eat a like amount. It is small wonder that even so large an animal as the walrus must be obtained in wholesale quantities. A full ice cellar, the natural freezing compartment carved out of the permafrost, is the only insurance of survival for a man, his family, and his dogs. The inroads of modern civilization have not dulled the keen sense of rapport with nature on the part of the Barrow Eskimo. END



Arrows represent electrified particles shooting out from the vicinity of sunspots. The particles are deflected by the magnetic field that surrounds the earth, but come in around the polar regions. Long axis is the geographic; short axis the geomagnetic. (After Gartlein)

Newest explanation of the NORTHERN LIGHTS—*SUNSPOTS!*

WHEN I was a boy I saw the mystifying display of searchlight beams sweeping slowly across the northern sky. Being told they were the "northern lights" was no explanation to satisfy the curiosity of a nine-year-old. I'm sure I must have asked, "What makes them?" – for I recall being told they were made by the sunlight reflected from the snow and ice in the Far North. The trouble with that explanation was that it did not account for the fact that aurorae occur during the northern winter when, for weeks, sunlight never reaches the great arctic wastes. But it satisfied me as a boy as it did most people. Having witnessed an auroral display at the mature age of nine, I offer here some expert information on the subject (gathered from more recent and more reliable sources).

The real explanation of the beautiful display is based upon a process of nature that is far grander than reflection of sunlight from icebergs.* The auroral light does arise from the sun, but in quite a different manner. The aurora is one of the few things which *can* be blamed on sunspots. The nature of sunspots is not completely understood, but we are aware that great bursts of light and streams of electrified particles are emitted from areas near the spots. The stream of particles, probably electrons, pours out from the sun like water from the nozzle of a hose. As the sun rotates, once in about 25 days, the stream of electrons sweeps around the solar system and requires the analogy of

*This brief account is based on "Unlocking Secrets of the Northern Lights," by Carl W. Gartlein, *The National Geographic Magazine*, Nov. 1947, pp. 673-704. Dr. Gartlein is director of the National Geographic Society-Cornell University Study of Aurora. The article is profusely illustrated, with eight pages in full color.

REVIEWS

ARCTIC, ANTARCTIC, ALASKA

Ends of the earth

NORTH OF THE CIRCLE. By Frank Illingworth. Philosophical Library, New York. 1952. 254 pp., 32 photographs. $4.75.

ARCTIC SOLITUDES. By Admiral Lord Mountevans. Philosophical Library, New York. 1953. xvi + 153 pp., 24 photographs, end-paper maps. $4.50.

THE FACE OF THE ARCTIC: *A Cameraman's Story in Words and Pictures of Five Journeys into the Far North.* By Richard Harrington. Henry Schuman, New York. 1952. xiii + 369 pp., 161 photos, 4 route maps. $6.00.

THE WHITE CONTINENT: *The Story of Antarctica.* By Thomas R. Henry. William Sloane Associates, New York. 1950. xii + 257 pp., map. $3.75.

SAILING DIRECTIONS FOR ANTARCTICA, *Including the Off-lying Islands South of Latitude 60°.* First edition (H. O. No. 138). Government Printing Office, Washington, D.C. 1943. xiii + 312 pp., 230 views (photographs and sketches), H. O. No. 2562, *Antarctica,* 1: 11,250,000 (hydrographic chart in several colors, inserted in back-cover pocket). $3.00. (Supplement, 1949, issued free.)

Less than a third of Alaska lies north of the Arctic Circle, yet in thinking about that mostly subarctic territory we tend to put it in an arctic context. A good idea, then, would be to examine that context to establish true relationships in our minds. Since this will take us to the northernmost land, we might as well have a southward look too — the Arctic and the Antarctic have many similarities while they are poles apart in more ways than one — and come out with a working idea of the polar regions generally. Space permits little more than mention of some books at hand; the books will have to tell their own story. In our opinion, they do it well.

Frank Illingworth is a British journalist who has traveled NORTH OF THE CIRCLE rather widely, so much of his reporting is firsthand. What isn't is ably compiled (though "Matuska" for Matanuska, in his chapter on "The American North" and "Athabraska" for Athabaska, are curious slips.) Of special interest are his descriptions of "The Russian North" — the Soviets bow to no one in arctic research and development — and such little-known places as Svalbard (Spitsbergen) where he visited the Norwegian coal-mining operations. There are chapters on farming and hunting in the Far North, much history interwoven, and a great deal about the Eskimos. There are stories, too, of the white men, and women, who have fallen under the spell of the North. A final chapter discusses strategy—concluding, "All we need is the wisdom to remain at peace."

Under his rather vague title, ARCTIC SOLITUDES, Admiral Lord Mountevans has given a not the least vague account of arctic exploration, starting with a surprising (to

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the hose nozzle to be changed to that of a rotating sprinkler. If the stream is directed in the right direction, it may "sprinkle" the earth. Owing to the interaction between electrified particles in motion and a magnetic field, the stream of particles is deflected by the earth's magnetic field to concentrate upon two rather narrow regions on the earth. The regions are roughly circular zones about 20 degrees from the north and south *geo-magnetic poles** of the earth. The zones are ring-shaped with the geo-magnetic poles at their centers. The geo-magnetic poles do not coincide with the geographic poles. The north geo-magnetic pole is situated at the northern end of Greenland near the west coast. The northern zone of greatest frequency of auroral displays runs through Iceland, Hudson Bay, northern Alaska, and the extreme north coast of Siberia. In this zone displays occur on an average of 240 days of the year. At the geo-magnetic pole itself the average is only about 50 days.

The physical process of the production of an aurora involves the excitation of atoms of oxygen and nitrogen in the earth's atmosphere at heights of from 35 to 600 miles by the incoming electrified particles from the sun. The process is quite like that which causes the glow in a neon sign, only the gas involved is oxygen or nitrogen (or both) instead of neon.

Study of aurorae has become important from a practical standpoint since the development and widespread use of radio-communication. The layer of air high overhead which reflects radio waves back to the surface and thus makes it possible to receive messages around the world, is affected by the same disturbances on the sun that produce aurorae. Even wire communication by telephone and telegraph is subject to disruption by "magnetic storms" created by the same streams of particles from the sun. Study of the light from aurorae yields information on the constitution of the atmosphere at heights above the earth as yet unattainable by other means. Such information is critical to the future of high altitude flights by rockets and other aircraft.

Many glowing descriptions of displays of the northern or southern lights are on record. One of them, given below, comes from the pen of George Kennan in *Tent Life in Siberia:*

"The whole universe seemed to be on fire. A broad arch of brilliant, prismatic colors spanned the heavens from east to west like a gigantic rainbow, with a long fringe of crimson and yellow streamers stretching up from its convex edge to the very zenith. At intervals of one or two seconds, wide, luminous bands, parallel with the arch, rose suddenly out of the northern horizon and swept with a swift, steady majesty across the whole heavens, like long breakers of phosphorescent light rolling in from some limitless ocean of space."

G.W.B.

*Not to be confused with the *magnetic poles.* The North Magnetic Pole is now located in Prince of Wales Island (American Geographical Society, New York, 1947).

us) reference to the Greek navigator Pytheas, 330 B.C. The Admiral was himself a polar explorer, as Lieutenant Evans, second-in-command of Scott's last antarctic expedition, and his present book is largely a digest of his own intensive study of the classic accounts of the arctic explorers. Franklin, Peary, Nansen, Stefansson, Rasmussen and the Eskimos, Amundsen, the Northwest Passage, polar flights — all are here, as well as the less well known story of the Siberian arctic. The Admiral's style is terse, salty.

THE FACE OF THE ARCTIC is, to Richard Harrington and his camera, the face of the Eskimo. On five journeys into the Canadian North, from Coppermine to Hudson Bay, Harrington lived and traveled by dog-team with Eskimos, Mounties, Hudson's Bay Company officers, and missionaries. The book is chiefly about Eskimos. They accepted him, for the time, into their lives because he, the Outsider, fully accepted their way of life—their food, their homes, their mode of travel, their pleasures, and their hardships, all the while taking the marvelous pictures that fill his book. "A book about Eskimos" sounds too ethnological or sociological. It would be truer to say this is a book about people, those native to the arctic regions. It would be even nearer the mark to say this is a book about Peter Kamingoak, Koikhok and his wife Kabunak, little Annie Tadedluk — individuals, sharing a way of life but each a person distinct from his fellows. The truest thing emerging from all the accounts of Eskimo life we've read is that these people who have through unnumbered centuries adapted themselves perfectly to the bleakest land on earth (except for Antarctica), have gained something in the process that other men might envy. They still live, in large part, in the Late Stone Age (though most of them hunt with rifles and fish with steel hooks). But they are at peace with their land and with each other. They have evolved a high ethic of courage, kindness, generosity, and humor. They have no word for war. They are uncrowded, unhurried — except where whites are trying to hurry them down the mechanized road to "civilization." They were in the best sense civilized before whites pushed rudely into their unfenced homeland. But that is another story.

That we may have been to both ends of the earth, let us look briefly at the Antarctic. We may see THE WHITE CONTINENT vividly through the eyes and studious mind of a journalist with the 1946-47 Navy expedition under Admirals Byrd and Cruzen. This is a first-rate popular account of Antarctica, its natural history, its discovery and exploration. Thomas R. Henry's book lacks only illustrations. For these and encyclopedic detail the Navy Hydrographic Office has provided a veritable monograph in its SAILING DIRECTIONS FOR ANTARCTICA, which belongs in any polar library even though it is designed primarily for those who go down to the farthest south in ships. There are complete summaries of exploration, whaling, the flora and fauna, ice, meteorology, and optical phenomena; and there is an exhaustive bibliography. D.G.K.

DISCOVERY IN BOOKS

Alaska in print

ALASKA TODAY. By B. W. Denison and associates. Revised edition. The Caxton Printers, Ltd., Caldwell, Idaho. 1950. xiv + 374 pp., 134 illustrations and maps. $5.00.

THE STORY OF ALASKA. By Clarence L. Andrews. (Seventh printing.) The Caxton Printers, Ltd., Caldwell, Idaho. 1947. 332 pp., 76 illustrations and maps; fully annotated and indexed; USGS "Alaska Map A," 1947, 1:5,000,000, folded, in back-cover pocket. $4.00.

WILDERNESS HOMESTEADERS. By Ethel Kavanaugh. (Second printing.) The Caxton Printers, Ltd., Caldwell, Idaho. 1951. 303 pp., 129 photos, end-paper maps. $5.00.

PROCEEDINGS OF THE ALASKAN SCIENCE CONFERENCE *of the National Academy of Sciences, National Research Council.* N.R.C. Bulletin Number 122. National Academy of Sciences, Washington, D.C. April 1951. ix + 216 pp., outline map of Alaska. Paper, $2.00.

The literature of Alaska is fairly extensive, to judge by the 172 samples in Mr. Andrews' bibliography—books, articles, documents, government reports, letters. The references include such familiar names as H. H. Bancroft, Rex Beach, Captain James Cook, William H. Dall, George Davidson, John Muir, Edward W. Nelson, Knut Rasmussen, George Vancouver. But since this department is mainly concerned with current books, we browsed San Francisco's leading *new*-book shop — and found few. Some Alaskans may be justified in their old complaint: people Outside are not as much interested in Alaska as they should be.

The recent titles listed above present a varied dish, nevertheless, with ingredients to suit many tastes. We are happy to acknowledge the courtesy of one small but very active publishing house in supplying us with the first three, and we can repay them in no better way than by suggesting that the interested reader write The Caxton Printers for their Alaska Circular — Alaska is a specialty of the house. If you want to know the ancient sources of the Alaskan Indian legends, for instance, there is *Alaska Beckons,* by the anthropologist Dr. Marius Barbeau (1947).

For an up-to-date, general, topical account of the Territory, we can recommend Mr. Denison's ALASKA TODAY. It is, in fact, the only such book we could find in the above-mentioned book store (we admit not having checked all current book catalogs), and for everyday purposes we think it serves very well. Opening with a quick look at Alaska since World War II plus a slightly Chamber-of-Commerce (Alaska Development Board, to be exact) -style invitation to prospective settlers, the author gives an idea of the variety and contrasts to be found, in climate, for example — "There is a cold Alaska; a dry, temperate Alaska; and a comparatively warm, moist Alaska." Other chapters tell the kind of people — possibly 130,000 — who live there now, how they work and play, and something about their cost of living. One is about the Alaska Highway, of course, and another is on air transport. Farming and the meat problem are dealt with, as well as such basic matters as government, taxation, social security, education, homesteading. There are the stories of roads and railroads; a look at Alaska's "Cash Crop No. 1" — scenery; accounts of fur farming, fisheries, forests. The chapter on "The Natives" might well have been longer — but this is a subject for many books. The "Who's Who" will naturally have to be revised for the next edition — Ernest Gruening is now ex-Governor. His successor, B. Frank Heintzleman, was Alaska's regional forester. And Frank Illingworth (1952,

see above) has referred to "the late" Cap Lathrop. Denison's associates are Frank Dufresne, former executive officer of the Alaska Game Commission, with a chapter on wildlife; Ward T. Bower, long-time chief of the Division of Alaska Fisheries, U. S. Fish and Wildlife Service, on the great salmon industry; Edward C. Johnston, general manager of the Pribilof Islands, who writes of fur sealing; and Dr. William H. Haas, professor emeritus of geology and geography at Northwestern University, with a chapter on the discovery and history of Alaska.

Lively and stimulating as it is, the book gains respect by its usually objective tone. We find no cause to discount the publisher's statement that "*Alaska Today* is a broad and accurate source of information for all prospective settlers, dreamers, students, and librarians (who have been pestered for years with questions about Alaska)." For editors. too!

Discovery and history will be for many the most fascinating chapter of the Alaska story. Fortunately, to give the full-length drama that Dr. Haas could merely outline, there is THE ALASKA STORY — and what a story it is! Mr. Andrews is well qualified to tell it, Alaska's history having been his chief interest during a long life of service to the territory in various capacities.

Alaska — the Aleut word, *Alyaska,* applied to the peninsular mainland — was the last great division of land to be discovered, excluding Antarctica. The year was 1741, the discoverer Vitus Bering, a Dane whom Peter the Great (d. 1725) had sent out to find "what lay beyond the Sea of Okhotsk [and whether] Asia and America were separated by an ocean." That it took Bering 16 years to progress from St. Petersburg to Cape St. Elias is in part a measure both of the obstacles to launching an expedition in those times, even by imperial command, and of the utter lack of knowledge about that part of the globe. Bering got there, though he did not live to see the results. These the author outlines in a closing paragraph to the chapter of discovery, which foreshadows nearly half the book:

"The importance of the discoveries was not at once recognized. Russia did not publish the account of the voyage as did England when Vancouver and Cook sailed to these shores. The mainland of America, the country we call Alaska, had been reached for the first time. The first definite knowledge of the northern part of the Pacific Ocean was obtained. The basis for Russian claims to their possessions in America had been laid. The way was opened to the hunters and fur traders, the Russian *promishleniki,* who later swept along the coast and explored every bay and inlet until finally permanent settlement was established which completed the title of the Czar to his holdings in the colonies of America. When the news reached the other nations, which it tardily did, it spurred the Spanish and the English to new ventures in the North Pacific. Bering and Chirikof had outlined the headlands and islands from Sitka to Bering Island; they had broken the mystery of the unknown and blazed the way across three thousand miles of uncharted seas, more than sixty years before Lewis and Clark crossed the continent of North America."

Survivors of Bering's expedition came home loaded—with fur. The rush to the Bering Sea and through the Aleutians to the Gulf of Alaska that followed launched 40 years of unbridled rapine, with not only the fur-bearers in their tens of thousands, but also an originally peaceful, good-natured human population, the Aleuts, taking the brunt. The fur trade was inevitably declining when in 1784 the trader Shelekof (or Shelikof, as in the strait named for him) founded the first Russian colony in America at Three Saints Bay on the southeast coast of Kodiak Island.

Alexander Andreevich Baranof took charge of the colony in 1790. During the next 28 years under this great leader and resourceful colonizer, the Russian American Company was organized and the expansion carried out that took the Czar's subjects in successive jumps to Yakutat, Sitka, and ultimately (1812) to Fort Ross on the California coast. (It is interesting to note here that a sealing station was maintained on the Farallones from 1812 to 1840; and that Aleut hunters operated for their Russian masters, by arrangement with Yankee skippers, as far south as Cedros Island, Baja California.) The period was marked by continual bloody warfare with Indians, and in fact the Russians lived in constant fear almost all their Alaska days.

The first effective, intelligent measures for the long overdue conservation of fur seals were taken at the insistence of Baron Wrangell, explorer-scientist, after he took charge in 1830. Here were the beginnings of a "sustained yield" policy, which went by the board after the Americans took over in 1867 until Federal control of sealing began in 1910. American whalers, meanwhile, had moved into the North Pacific grounds and virtually wiped out the right whale from under the Russians' noses.

The story during the final 30 years or so — and Mr. Andrews emphasizes it by repeating the statement — was that "Russia was losing her grip on her colonies in America." In very fact, but for the promoters of the Russian American Company there would have been no colonies — the Russian government seems never to have looked on Alaska as anything but a nuisance. Imperial Russia, in the end, appeared only too glad to quit-claim the territory to the United States rather than see Britain get it through the increasing pressure of the rival Hudson's Bay Company. It is easy for us, now, to see the whole thing as one of the great "misses" of history from Russia's point of view, while we shudder at the thought of Soviet bases within 600 air miles of Puget Sound.

It may shock some of us, therefore, to learn that for 30 years after Secretary Seward's farsighted purchase our Government did almost nothing about Alaska, either. We did not even provide our new territory with any sort of home government. In one crisis Alaskans had to call on a British warship to bring a semblance of law and order! More than half of *The Story of Alaska* concerns the American years since 1867. This part becomes increasingly a plea for Alaskan development, drawing a parallel with Scandinavia as a model of what can be done in those latitudes. The author quotes Dr. Alfred H. Brooks as stating, "We may confidently expect the time will come when Alaska will support a population of 10,000,000 people." Without going into the question whether such growth is in itself uninquiringly to be desired — perhaps it is for science to give us an answer, in time — we can turn to some equally enjoyable reading about one phase of the conquest of Alaska.

If it all had to be tamed the way two WILDERNESS HOMESTEADERS, Ethel Kavanaugh and her daughter, Dot, did it, most of Alaska's wilderness would be safe for

several generations more. Very likely there just aren't too many, these day – men or women – with the guts for that kind of pioneering, where you start out with a packboard on your back and a rifle in your hand. You are 35 miles from a landing strip and a general store, no road, miles from the nearest homesteader – and you are a woman. Not only that. Your preparation for this kind of life? Raised on a farm, yes – but your recent life has been spent behind a typewriter in San Francisco, dreaming. Then one day you and your daughter take the savings and go – to other typewriters, in the Land Office at Anchorage. Another two years of scrimping, and there you both are, trudging up Kachemak Bay from tiny Homer on Kenai Peninsula. This is your dream coming true – oh, your aching back!

It took several years from the day she nailed her claim-papers to a cottonwood tree in Fox Valley for Ethel Kavanaugh's dream to become a year-around home. They saw others come, file, pull out. "I didn't think it would be as bad as this," one man said, of a winter. "I just don't want any more to do with it!" So Dot took over his homestead. *She* was just twenty-one!

This is a fresh and racy narrative, and one calculated either to discourage completely any prospective homesteader, or jell his resolve to go and do likewise, depending on his mettle – or how possessed he is by his dream. And for the most of us who have no present thought of pioneering America's last frontier, this true story of two women who did is capital reading. We are glad Ethel Kavanaugh found room in her log cabin for a typewriter!

An approach to Alaska farther from that of two women slogging into the wilderness on snowshoes than that of a 450-delegate scientific conference in Washington, D.C., is hard to imagine. Yet the two are more closely related than you might think. A glance through the PROCEEDINGS OF THE ALASKAN SCIENCE CONFERENCE makes it clear that a great deal of what scientists are doing in and for Alaska is directed toward making life easier and more inviting for the Kavanaughs – the present and future residents of Alaska, whoever they may be.

"A scientific laboratory" Governor Heintzleman called Alaska in his editorial in this issue. The truth of that statement is amply illustrated by the addresses, abstracts, and papers presented in the *Proceedings* of the first of a series of annual conferences (the fourth, as the Governor stated, will be held in Juneau this coming September). A great deal of the research described is of course in the realm of so-called "pure science" – knowledge for its own sake: Eskimo archeology and problems of early man in Alaska and the Arctic; the native flora; geophysics, oceanography, and glaciology – though even such studies may bear on problems of present and future human life in the region.

The most direct bearing on the life of people is obvious in most of the topics discussed: agriculture and forestry (soils, forest research); anthropology (what is happening to the Eskimo?); geology and geography (petroleum, surveying and mapping); meteorology (factors affecting Alaskan development and the climate of the continent; climate, insects, and man); physiology (acclimatization to the cold); public health and medicine (psychological aspects of arctic and subarctic living, water-supply and sewage-disposal problems)); zoölogy (fisheries, waterfowl, fur, predator control) – this is a sampling of the papers and abstracts. Symposia dealt with permafrost; health problems of Alaskan Eskimos, Aleuts, and Indians; relationship of vegetation to the physical environment; sea ice. Mr. Heintzleman, then Alaska's regional forester, gave an address on forest resources; others spoke on mining, national defense, and development. Besides giving a paper on botanical research, *PD*'s associate editor Ira L. Wiggins described the facilities of the Arctic Research Laboratory of which he is director. The parts of their institutions in Alaskan research were outlined by A. L. Washburn, executive director of the Arctic Institute of North America, and Terris Moore, president of the University of Alaska. Medical institutions represented were the Arctic Aeromedical Laboratory and the Arctic Health Research Center.

Readers interested in a closer look at what science is doing in and for Alaska than Governor Heintzleman could take in our editorial pages will find in the *Proceedings* a quite comprehensive survey along with much detailer information on specific subjects.

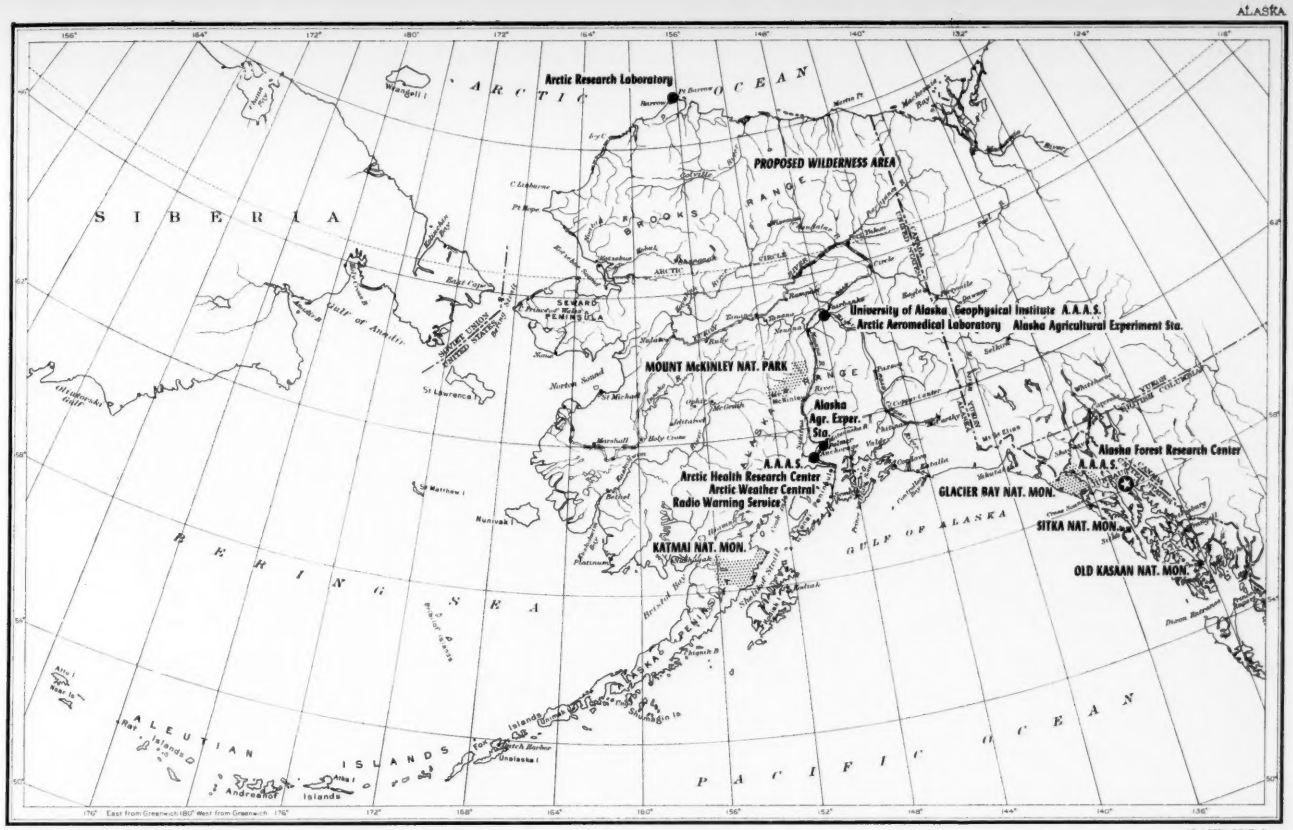
MOUNT McKINLEY AND THE ALASKA RANGE IN LITERATURE: *A Descriptive Bibliography*. By Bradford Washburn. The Museum of Science, Boston. 1951. 88 pp. Paper, $2.50.

One day in the summer of 1896 W. A. Dickey and fellow prospectors on the Susitna River, north of Cook Inlet, saw a great mountain of the Alaska Range. They were sure it was over 20,000 feet high, the highest peak in North America, and forthwith named it after William McKinley of Ohio, who had just been nominated for the presidency. *The Sun* of New York published Dickey's account in January 1897, under the heading, "Discoveries in Alaska." It is reprinted in full at the end of Dr. Washburn's *Bibliography*.

Bradford Washburn, director of Boston's Museum of Science and one of America's foremost mountaineers, has been intimately associated with Mount McKinley for more than fifteen years. "He has twice stood on the South Peak," Francis P. Farquhar said in his brief introduction to "Mount McKinley from the Air" (twelve photographs by Bradford Washburn, *Sierra Club Bulletin*, June 1950); "he has climbed the North Peak as well; . . . and he has flown many times close to and around the mountain in the course of an intensive survey of its glaciers and ridges." Rare combination of scientist, artist-photographer, man of action, and man of letters, Bradford Washburn is, we venture to say, uniquely qualified as Mount McKinley's bibliographer – he has actually read every one of the 264 items. A great deal of the history of exploration in the Alaska Range can be learned, with enjoyment, just from his comments and quotations.

The present edition was specially published for distribution at the Second Alaskan Science Conference at Mount McKinley National Park, September 1951. Everyone interested in Alaska literature should get it by writing to the Museum of Science, Boston 14, Massachusetts.

The *Sierra Club Bulletin*, by the way – the Annual – should be watched for Alaska articles. The 1952, for instance, contains "First Ascents in the Northern St Elias Range," by Alfred W. Baxter, Jr., and, of more general interest, "Magnificent Katmai," by Lowell Sumner of the National Park Service, with a splendid set of the author's photos from the air. D.G.K.



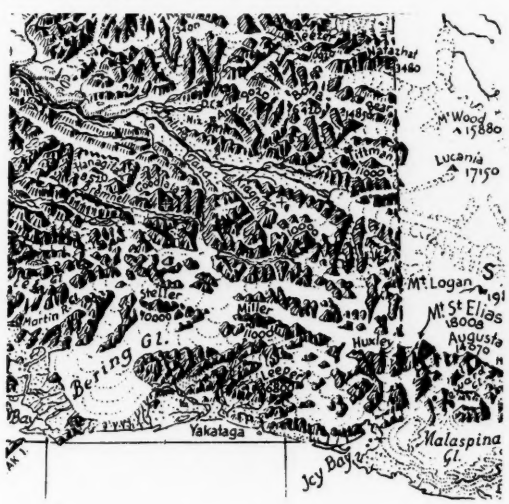
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

ALASKA MAP C
Printed 1952

ALASKA IN MAPS

Alaska Map A (1947, 80 miles : 1 inch, 10 cents), and *Alaska Map E* (1946, 40 miles : 1 inch, 50 cents), may be obtained by writing U. S. Geological Survey, Federal Center, Denver, Colo. Enclose coin or M.O. — *not* stamps. *Landform Map of Alaska* (1948, 50 miles : 1 inch, 60 cents plus 20 cents postage) — sample section below, actual size —may be obtained from the cartographer, Dr. Erwin Raisz, 107 Washington Ave., Cambridge 40, Mass.

Alaska Map C, above, with information added, is reproduced approximately ⅗ actual size.



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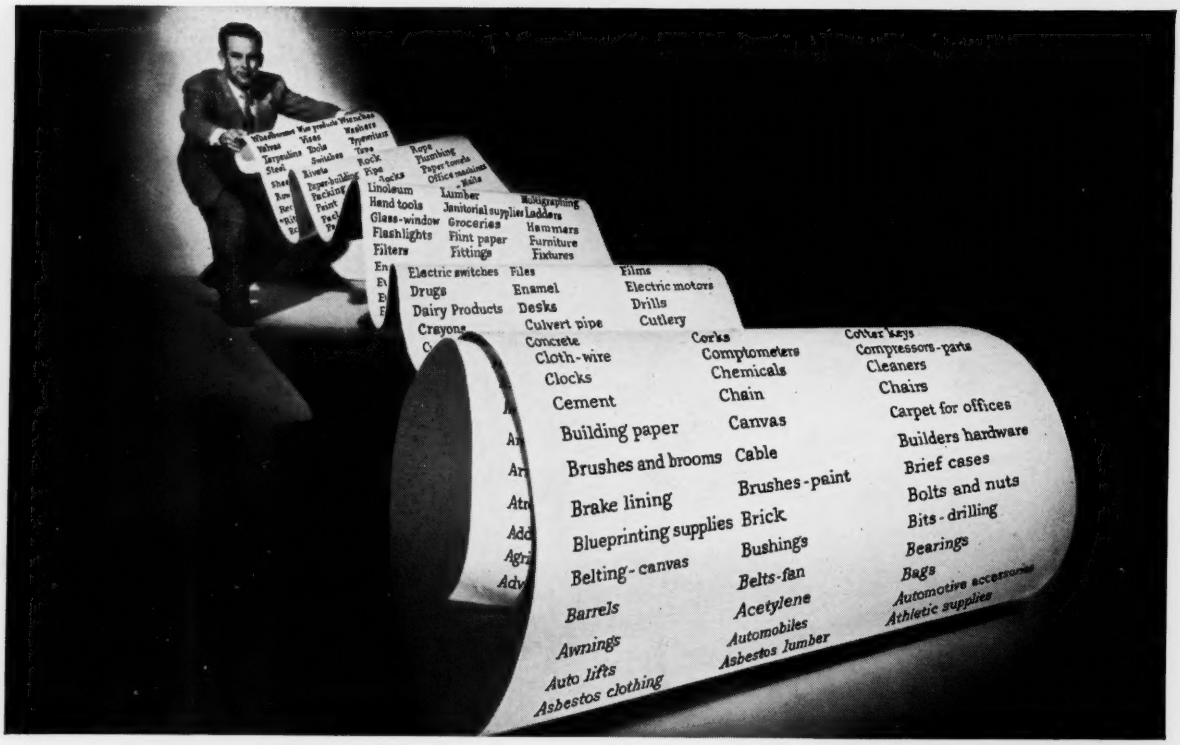
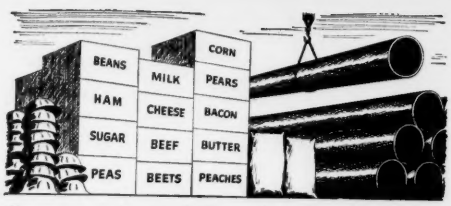


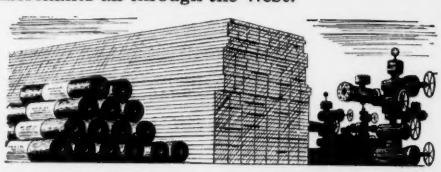
If you were to jot down all the different kinds of goods and services Standard Oil Company of California buys, your shopping list would be about 50,000 items long. Over the years, we've been growing as a *customer* as well as a supplier here in the West.

But the most important aspect of our "shopping," we believe, is *where* we do it. You might think that a large company like Standard would centralize its buying in a few big cities. Actually, our purchases are made in hundreds of Western communities. The almost infinite variety of Standard's needs—from paper clips to propellers, from produce to professional services—has made the Company an important factor in the economic well-being of Western towns and cities.

Last year, once again, Standard was a very good customer for a great many firms—more than 10,000 suppliers, both large and small, to whom we paid more than $125,000,000. We've always bought locally wherever possible and practical. We do it not only because it's good business for Standard, but also because it helps the growth of the West. We know that our long-run prosperity depends on that of the communities we serve.



From groceries to drilling pipe, Standard's purchases in local communities mean business to merchants all through the West.



We buy building materials—lumber, roofing, plumbing, carpentry, and supplies for our oil fields, refineries, plants, and offices.

We also use the services of doctors, nurses, pharmacists, lawyers, engineers, surveyors, drilling contractors, geophysicists and many others.

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